Lifelong Learning
Erasmus
University of Ruse

Faculty
of Automotive and Transport
Engineering

UNIVERSITY OF RUSE

FACULTY
OF AUTOMOTIVE AND TRANSPORT ENGINEERING

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 Faculty of Automotive and Transport Engineering and the courses offered by the Faculty 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, 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.

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 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.

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.

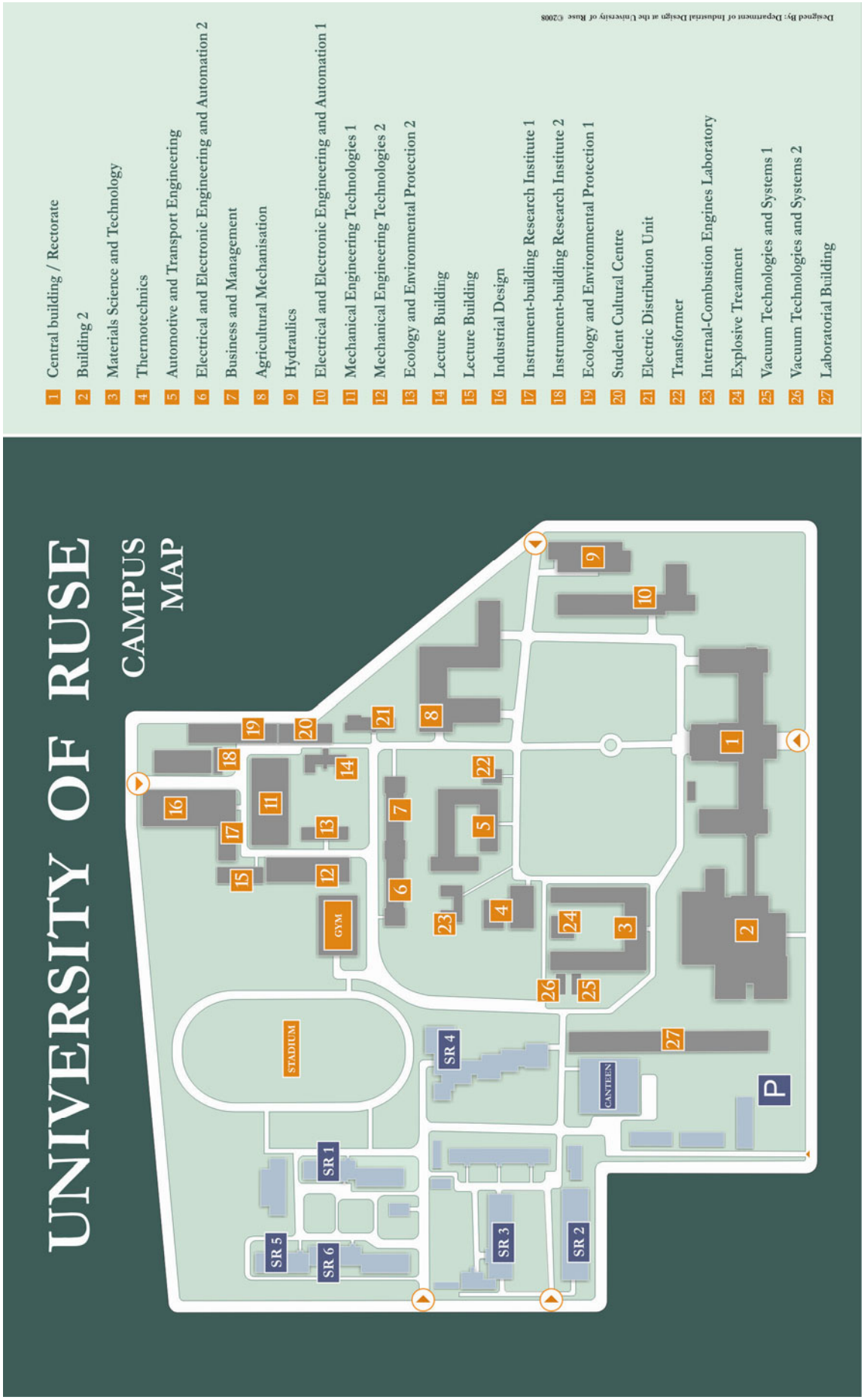
Phone Services: Street phones can be used with a phone card (either "Bulfon" or "Betkom"). Phone cards are available at post offices, stations of the public transport or news-stands. For international calls you may use the above phone cards or phones in post offices. There are 3 large mobile network 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 FACULTY OF AUTOMOTIVE AND TRANSPORT ENGINEERING

The Faculty of Automotive and Transport Engineering
(Faculty of ATE)

The Faculty of Automotive and Transport Engineering was founded in 1987. It is a significant educational centre in field of automotive engineering and transportation in Bulgaria.

Five departments operate within the Faculty – **"Internal Combustion Engines", "Transport", "Automobiles, Tractors and Fork-lift Trucks", "Machine science and machine elements", "Engineering drawing"**. The management bodies of the Faculty are the Faculty Assembly, the Faculty and Dean's Councils, and the departments are managed by Departmental Councils and the Heads of departments.

The Faculty **teaches students in to the following programs, accredited** by the National Evaluation and Accreditation Agency of Bulgaria:

Bachelor degrees:
- Automotive engineering
- Transport Management and Technology

Master degrees:
- Automotive engineering
- Transport Management and Technology
- Investigation of Internal Combustion Engines
- Automated design of transportation machines and machine tools

PhD level:
- 02.01.42 "Internal Combustion Engines"
- 02.01.49 "Automobiles, Tractors and Fork-lift Trucks"
- 02.14.07 "Management of Automobile Transport"
- 02.01.03 "Machine science and machine elements"

High quality of teaching is achieved thanks the modern facilities, the high-level expertise of the academic staff and the traditions in the training of engineering graduates. At disposition of the students are 32 specialized laboratories. Over the 75% of teaching stuff have an academic rank (Assoc.Prof, or Professor). Over 800 students in different degrees and levels study in the Faculty.

The Faculty has bilateral agreements and connections with **universities from England, Germany, Denmark, Belgium, Sweden, Ireland, Spain, Italy, Russia, Romania, Croatia, and Turkey.**

The **main research fields** are: Internal Combustion Engines, Automotive Engineering and Agriculture Tractors, Fork-lift Trucks, Traffic Management, Traffic Safety, Transport Management, ICE and Automobile Testing, Transport Ecology, Mechanical gears, CAD.

Dean:

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ECTS
Coordinators

Faculty ECTS Coordinator:

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Department of Transport
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Department of Machine Science and Machine Elements
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tel.: + 359 82 888 461, e-mail: tomy@ru.acad.bg

Department of Engineering Graphics
Principal Assistant Prof. Krasimir Kamenov, MEng
tel.: + 359 82 888 352, e-mail: kkamenov@ru.acad.bg

DEPARTMENTS IN THE FACULTY OF AUTOMOTIVE AND TRANSPORT ENGINEERING

DEPARTMENT OF INTERNAL COMBUSTION ENGINES

BUSINESS CARD of the Department

Head of the Department

Assoc. Prof. Hristo Kanchev Stanchev, PhD

Phone: +359 82 888 275

E-mail: hstanchev@ru.acad.bg

The Department of Internal Combustion Engines was established in 1964.

The Department consists of 9 academic staff, including 2 full Professors, 6 Associate Professors, 1 Senior Assistant Professor and 3 supporting staff members.

The Department is accredited to teach undergraduate **Bachelor** degree and postgraduate **Master** and **PhD** degrees.

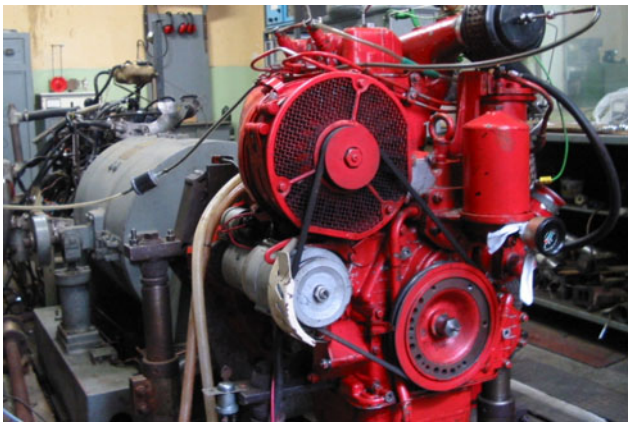
Research activities in the following areas are carried out:

- Electronic control systems;
- Modelling and investigation of processes in IC Engines;
- Emission control and emission reduction technologies;
- Alternative fuels and fuel additives;
- Fuel systems of petrol and diesel engines;
- Engine adaptation to the vehicles and machines.

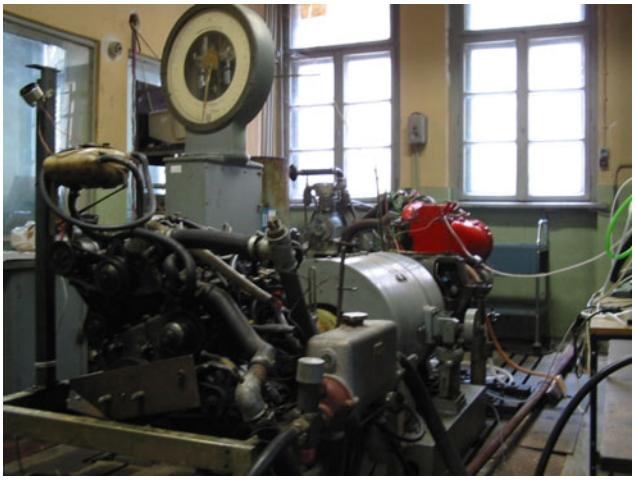
Professors and students participate in various international educational and research programmes such as **TEMPUS, ERASMUS** and **Framework Programmes of the European Community**. Within the framework of international co-operation students can study at different leading universities in Belgium, France, Italy, Austria, Germany, Greece, Poland, Croatia etc.

The teaching process is accomplished by highly qualified Professors following curricula that comply with the Decree of the Government for uniform state requirements for awarding University diplomas in Transport Machinery and Technologies.

Specializations in Internal Combustion Engines for Bachelor degree and Investigation of Internal Combustion Engines for Master degree are provided. There is a good tradition in doctoral postgraduate study at the Department. Seven postgraduate students successfully defended their Doctoral theses in the last three years.



Students have their classes in well-equipped laboratories. There is a possibility to test engines in **5 to 400 kW** power range at 6 test rigs. Our department is fitted with full equipment for emission measurement, including the only one in Bulgaria mini dilution tunnel for **PM** emission determination.



There is the only one SAE student club in Bulgarian Engineering Faculties. The members read the Automotive Engineering magazine free of charge and have got permission to read scientific papers presented at SAE congresses.

Most of the Professors speak English and Russian and give lectures at foreign universities.

The students receive profound knowledge and a wide spectrum of subject specific skills in the field of Automotive Technology, Design and Systems of IC Engines and Modern Technologies for Efficiency Improvement and Exhaust Emission Reduction of IC Engines. After graduation they can work in the different fields of Industry, Power Engineering, Transport, Agriculture, etc.

DEPARTMENT OF TRANSPORT

BUSINESS CARD of the Department

Head of the Transport Department

Assoc. Prof. Mitko Marinov, PhD

Tel.: +359 82 888 609, +359 82 888 608

E-mail: mdmarinov@ru.acad.bg

http://transport.ru.acad.bg/

http://www.ru.acad.bg/faculties/tf/transport/index.php

The Department of Transport was established in May 1977.

Eight lecturers and two employees work in the Department of Transport, of whom five have a PhD degree, and four are Associate Professors and Professors.

At the time of establishment students from the Department of Automobiles, Tractors and Fork-Lift Trucks were taught. Nowadays the Department provides training for the students who study at the Departments of Transport Engineering and Automobile Transport Management and Technology.

The Department of Transport got a valid institutional accreditation from the National Assessment and Accreditation Agency and the right to provide training of PhD students for the degree course 02.14.07 Automobile Transport Management and Technology.

The members of the Transport Department conduct research and development activities in the following fields: Transport, Transport Technology and Logistics; Technical Exploitation of Transport Vehicles; Traffic Organization, Management and Safety.

Staff of the Department of Transport

Laboratory of Traffic Engineering and Control

The teaching laboratories are equipped with technical devices and this is an opportunity for the students to work in conditions close to the real ones. A part of the training is carried out in service stations, transport terminals and companies.

The Transport Management and Technology degree course prepares professionals for scientific and practical work in the areas of systems theory, design and architecture, socio-technical enterprise systems and research methods, within a transportation framework. In order to increase the reliability, safety and effectiveness of the automobile transport and because of its significant influence over the European transport market condition, "The main rules for admission to the occupation of road haulage operator and road passenger transport operator" have been developed.

The teaching process provides knowledge and competence, which guarantee our students a successful professional realization as engineers on the national and the European labour market and in the field of transport services.

A test car of the department of Transport at University of Ruse established to collect, calculation and interpretation of data for car movement, driver behaviour and geometric parameters of the road etc.

The lecturers from the Transport Department are authors of textbooks and handbooks which are used during lectures and seminars. During the teaching process educational and visual aids, as well as adapted transport information systems are used. A textbook of true merit for the students is "Intermodal Forms of Transportation".

Laboratory of diagnostics and maintenance of transport machinery

Students trained in the degree programme Automobile Transport Management and Technology receive thorough knowledge and acquire a wide range of professional skills in the optimisation of transport of passengers and cargo, logistics and modelling processes in transport, diagnostics and maintenance of transport equipment, organization and management service in transport, organization, safety and traffic management transport and intelligent transport systems. The Department of Transport prepares highly qualified specialists in full compliance with the EU requirements, which are able to find optimal solutions to complex transportation problems and find professional realization on the United European Transport Market. After their successful graduation they can work in different sectors of industry in the field of transport service, services, traffic safety and others.

DEPARTMENT OF AUTOMOBILES, TRACTORS AND FORK-LIFT TRUCKS

BUSINESS CARD of the Department

HEAD OF DEPARTMENT

Assoc. Prof. RUSI GETSOV RUSEV, MEng, PhD

Tel/fax: +359 82 888 524, +359 82 888 526

E-mail: rgr@ru.acad.bg

www.ru.acad.bg/faculties/tf/atk/index.php

The Department of Automobiles, Tractors and Fork-lift Trucks was created in 1975. The Department consists of 8 academic staff, one of whom is full Professor, five are Associate Professors, two are Assistant Professors, one - driving teacher and two - supporting staff members.

Staff of the Department

The Department of Automobiles, Tractors and Fork-lift Trucks take part in the teaching process of “Bachelor” and “Master” academic degrees, as well as PhD degree.

The Bachelor degree includes the following degree programmes: *Automotive Engineering*, *Transport Technology and Management*, *Agricultural Engineering and Technology*, *Hydraulic and Pneumatic Machinery* and *Industrial Design*, and the Master degree includes *Automotive Engineering*.

The Department teaches the following courses: Structure of Internal Combustion Engines and Automobiles; Automotive Engineering I and II; Design of Automobiles and Tractors; Electric and Engine Trucks; Reliability of Vehicles; Railway Machinery; Automobile and Tractor Testing; Electronic Systems in Engines and Automotive Engineering; Control Systems in Automotive Engineering; Transport Vehicles; Testing and Research of ICEs and TVs; Buses and Troleybuses; Road-construction Machinery; Specialised Automobile Transport Means; Application Software in Service Activity.

The scientific and research activities of the Department are concentrated in the fields of:

- Optimization of fuel consumption of vehicles;
- Improvement of the means and methods for projection, testing and exploration of vehicles;
- Decreasing of slipping of tire tractors;
- Improvement of the movement stability and the steering of vehicles;
- Decreasing of tire wearing;
- Decreasing of the polluting emissions of vehicles, the noise and the vibrations.

The Department has a laboratory automobile, 6 laboratories and study rooms, where the students have the opportunity to take active part in the scientific and explorative activities, carried by the Department, and thus to acquire wide knowledge and abilities in specific fields.

Testing car VAZ 21102

Laboratory installation for tire testing

The teaching process is carried by highly qualified teachers implementing modern educational programs, according to the state requirements, the practical necessities and in compliance with the international standards for this degree programme.

Student scientific conference ►

◄ Foreign students working in the automotive engineering laboratory

Twenty-eight full-time and part-time doctors have successfully completed their dissertations. Among them are some foreigners: 4 from Vietnam, 1 from Syria, 1 from the Ukraine, 1 from Nigeria and 1 from the Republic of Yemen.

In the structure of the Department of Automobiles, Tractors and Fork-lift trucks a Centre for Teaching in Transport Machinery (CTTM) functions that prepares students at the university for acquiring driving licenses category “B” and carries out different qualification courses and supplementary studies in the field of the transport machinery.

DEPARTMENT OF MACHINE SCIENCE AND MACHINE ELEMENTS

BUSINESS CARD of the Department

HEAD OF DEPARTMENT

Assoc. Prof. PhD IVAN GEORGIEV SPASOV

Phone: +359 82 888 235, +359 82 888 592

E-mail: igs@ru.acad.bg

http://www.ru.acad.bg/faculties/tf/mme/site/index.htm

The department of Machine Science and Machine Elements is one of the oldest units at the University of Ruse "Angel Kanchev" in Ruse. The beginning was the establishing of the first department of Machine Science and Machine Elements in 1947. Its leader was Prof. Karl Slavomirov. A very important period for the education was the creation of the study and training laboratory in Machine elements in 1966. In 1978 the unit Technical drawing was established as a separate one. During this period 12 lecturers – 3 Professors, 6 Assoc. Professors and 3 Assistant professors were working at the department of Machine Elements. At present the academic staff of the department consists of 6 lecturers with academic rank and one assistant professor. All lecturers have PhD degrees.

The department is engaged in the education of students from the following professional areas:

- Mechanical engineering;
- Electrical engineering, electronics and automation;
- Transport, navigation and aviation;
- Materials and material science;
- General engineering.

The subjects, which are included in the main education module and which are delivered during the second and the third semester, are:

- Machine elements – I;
- Machine elements – II;
- Machine elements – case studies and course projects;
- Machine science;
- Machine elements and mechanisms;
- Fundamentals of design;
- Design methodology;
- Fundamentals of design – II;
- Technical drawing and Machine elements;
- Design of technical objects.

The department is engaged in the following scientific and research activities:

- Design, construction and production of transmissions for machines and equipment;
- Design and optimization of parameters of gear trains through creation of geometrical and strength contours;
- Design and production of reducers and motor reducers with cylindrical, worm and bevel gear trains;
- Design of machines for quality control of production from food, chemical and textile industry.

Three laboratories belong to the department of Machine science and Machine elements, which are used actively for the study process at the bachelor and master degree courses and for the supervising of students working on their final projects and theses and of doctoral students from the scientific area Machine science and Machine elements.

DEPARTMENT OF ENGINEERING DRAWING

BUSINESS CARD of the Department

HEAD OF DEAPARTMENT

Assoc. Prof. Ventsislav Dimov Dochev, PhD

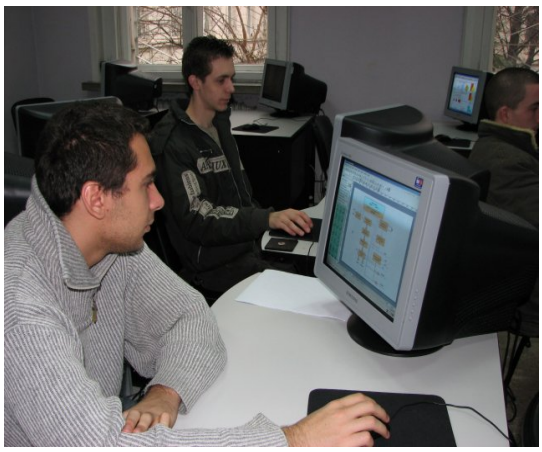
Tel.: +359 82 888 437, +359 82 888 846

E-mail: dochevv@ru.acad.bg

The Department of Engineering Drawing was created in 1977. The Department consists of 8 academic staff and supporting staff members. It is one of the oldest Departments of the University of Ruse.

The Department of **Engineering Drawing** take part in the teaching process of Bachelor degree programmes and **teaches the following courses,** included into the basic educational module (I and II semesters):

- **Engineering Drawing, part 1 and 2**
- **Applied Geometry and Engineering drawing, part 1 and 2**
- **Fundamentals of Design, part 1 and 2**
- **Technical Documentation using ACAD**



The scientific and research activities of the Department are concentrated in the fields of:

- **Design and technical documentation with PC of:**
  - vacuum technology systems;
  - cutting instruments;
  - electrical, electronic and mechanical devices.
- **Standardization documents concerning engineering drawing and technical documentation.**

The Department participates in the process of developing of ISO standards and attitudes on existing standards. Members of the Department participate in the Technical Committee 22 of the Bulgarian Standard Institution.

- **Methodical problems, concerning elaboration of didactic materials for education in Engineering Drawing and process of devices construction.**

The teaching staff is highly qualified in Computer Graphics and its practical application.

Different devices and constructions for the industry are developed in the Department.

UNDERGRADUATE PROGRAMS

UNDERGRADUATE STUDIES IN AUTOMOTIVE ENGINEERING

PROFESSIONAL STANDARDS
OF A BACHELOR IN

AUTOMOTIVE ENGINEERING

Degree programme: **Automotive Engineering**
Educational Degree: **Bachelor**
Professional Qualification: **Mechanical Engineer**
Semester of education: **4 years (8 semesters)**

Aims: The main aim of the **Automotive Engineering** degree course is to prepare highly qualified bachelors of engineering for the business and industry.

The professional suitability of a Bachelor of Engineering in **Automotive Engineering** is: to perform engineering, design, research and management activities in the development, manufacturing, maintenance and repair of internal combustion engines, automobiles and transport vehicles, tractors and fork-lift trucks as well as railway machinery; carry out technical and gradeeting research; to organise and manage road transport; to analyse and evaluate the efficiency of transportation and vehicle manufacturing processes and the use of transport vehicles; to carry out teaching and other activities in the field of transport, agriculture and other sectors of the country's economy.

A Bachelor of Engineering in Automotive Engineering should possess high professional grounding, considerable linguistic competence as well as competence in many other areas of human knowledge.

The general profile engineering education of bachelors includes:

Study of mathematics, physics, chemistry, mechanics, strength of materials, informatics, applied geometry and engineering graphics, machine elements, theory of mechanisms and machines, fluid mechanics, heat engineering, electrical engineering and electronics, mechanical engineering, metrology and measuring equipment.

Their special profile training includes:

Theory and design of Internal Combustion Engines, theory and structure of automobiles, tractors and fork-lift trucks, electric and electronic equipment in automobiles and tractors, railway machinery, repair and maintenance of transport vehicles, reliability of transport vehicles, transport engineering and organisation, materials handling machinery and processes in transport, company management, transport gradeeting, technical safety, traffic safety and ecological issues in transportation. Through a set of compulsory electives the bachelors of engineering enrich their knowledge of internal combustion engines (theory of ICE, dynamics, design and calculations of ICE, ICE testing, fuel systems and automatic governing of ICE) or their knowledge of automobiles and tractors (electrical and mechanical fork-lift trucks, design of automobiles and tractors, automated systems in automobiles and tractors).

A Bachelor of Automotive Engineering will possess the following general engineering skills:

- to design and construct separate parts, units and aggregates, systems, machines and facilities;
- to participate in the manufacture of the respective machinery and facilities;
- to organize the efficient use, repair and maintenance of transport machinery and facilities;
- to apply modern mathematical methods as well as computer and microcomputer equipment in engineering practice.
- to apply methods of technical and economic analysis and evaluation;
- to carry out gradeeting and economic research and analysis of transport activities, manufacture and systems in transport and transport companies.

The bachelors, who have enriched their knowledge of ICE by means of the compulsory electives, will possess the following skills;

- to design and build engines and parts, mechanisms and engine units;
- to prepare and carry out testing and investigation of engines, their parts, units, mechanisms, aggregates and systems.

The bachelors, who have enriched their knowledge of automobiles and tractors by means of the compulsory electives, will possess the skills to design, construct and test:

- automobiles;
- tractors and fork-lift trucks;
- parts;
- units;
- aggregates and systems.

Graduates of the Bachelor of AUTOMOTIVE ENGINEERING degree course can be employed in companies which manufacture and repair engines, automobiles, tractors, fork-lift trucks, electrical fork-lift trucks, road constructing machinery and railway machinery; in companies manufacturing parts and components; in research and development departments; in transport companies, in agricultural and road-construction companies; in companies trading in transport vehicles and parts, in national agencies and ministries of transport; in higher and secondary schools of transport and transport engineering.

CURRICULUM

of the degree course in

AUTOMOTIVE ENGINEERING

First year

Code	*First semester*	*ECTS*	*Code*	*Second semester*	*ECTS*
0380	Applied Geometry and Engineering Graphics 1	4	0002	Informatics 2	4
0410	Chemistry	4	2068	Mathematics 2	5
1024	Mathematics 1	5	2069	Physics	6
1038	Information Technologies I	4	2070	Applied Geometry And Engineering Graphics 2	4
2073	Material Science	6	2071	Mechanics 1	5
0077	Technological Training Practice	3	0542	Economics	4
	Foreign language:		0543	Exploitation Materials	2
0894	English				
0895	German	4			
0889	French				
0891	Russian				
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Second year

Code	*Third semester*	*ECTS*	*Code*	*Forth semester*	*ECTS*
2254	Mathematics 3	4	2543	Machine Elements 1	6
2402	Strength Of Materials 1	5	2544	Strength Of Materials 2	4
2529	Fluid Mechanics	6	2545	Theory of Mechanisms and Machines	5
2530	Electrical and Electronic Engineering	6	3058	Theory of Mechanisms and Machines - Course Project	2
2531	Mechanics 2	4	2546	Heat Engineering	5
2532	Technology of Materials	5	*2555*	Manufacturing Technologies	5
			2556	Structure of Internal Combustion Engines and Vehicles	3
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Third year

Code	*Fifth semester*	*ECTS*	*Code*	*Sixth semester*	*ECTS*
2558	Materials Handling Engineering in Transport	4	2831	Electric Equipment of Automobiles and Tractors	4
2559	Internal Combustion Engines	8	3037	Automotive Engineering II	5
2560	Automotive Engineering I	8	3038	Maintenance and Repair of Transport Machinery	5
2561	Machine Elements II	3		**Module A**	
3059	Machine Elements II – Course Project	2	3039	Dynamics, Design and Calculation of Internal Combustion Engines	7
2657	Technical Documentation Using AutoCAD	1	3060	Dynamics, Design and Calculation of Internal Combustion Engines – Course Project	2
2807	Metrology and Measurement Equipment	4	3040	Theory of Internal Combustion Engines	7
	Total Credits for the semester:	***30***		**Module B**	
			3041	Design of Automobiles and Tractors	7
			3061	Design of Automobiles and Tractors– Course Project	2
			3042	Electric and Engine Trucks	7
				Total Credits for the semester:	**30**

Fourth year

Code	*Seventh semester*	*ECTS*	*Code*	*Eighth semester*	*ECTS*
3044	Traffic Safety	4	3051	Ecological Problems of the Transport	2
3045	Transport Gradeeting	4	3052	Technology and Organisation of Transport	5
3046	Technical Safety	2	3053	Electronic Systems in Engines and Automotive Engineering	2
3047	Reliability of Vechicles	6	**Module A**		
3048	Railway Machinery	6	3054	Fuel Systems and Automatic Control of Internal Combustion Engines	7
Module A			**Module B**		
3049	Testing of Internal Combustion Engines (ICEs)	8	3055	Vehicle Control Systems	7
Module B			3056	Self-Preparation for the Final Project	4
3050	Automobile and Tractor Testing	8	3057	Bachelor thesis	10
Total Credits for the semester:		***30***	***Total Credits for the semester:***		***30***

Total Credits for the degree programme: 240 ECTS Credits

0380 Applied Geometry and Engineering Graphics 1

ECTS credits: 4
Weekly workload: 1lec+0sem+0labs+2ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Engineering Graphics
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikola Nikolov, MEng, PhD, Dept. of Engineering Graphics, tel: 888 491,
E-mail: nnikolov@ru.acad.bg
Abstract:
The course introduces students to the methods and means of presentation of three-dimensional objects by plane images and to the ways of analysis, transformation and optimisation of graphic images. A course prerequisite is basic knowledge of geometry and technical drawing. It develops students' steric imagination, as well as the skills needed to cope with graphic and technical information. This subject is a prerequisite for studying other technical branches of science.
Course content:
Types of projection. Complex drawing. Reciprocal position of principal geometric objects. Transformation of a complex drawing. Methods for projection. Reciprocal crossing of geometric objects. Images in drawings. Axonometric projection.
Teaching and assessment:
The theory, presented at lectures by didactic means, provides the base needed for practical classes and course assignments. During the practical classes problems are solved, instructions are given, examples are considered. Students are required to do a course assignment, which represents a number of plans with different images of steric objects.
The final grade is formed on the basis of the grades of two tests and the course assignment results. The requirements to have a semester validated are regular class attendance and course assignment submission.

0410 Chemistry

ECTS credits: 4
Weekly workload: 2lec+0sem+1labs+0ps+p
Assessment: exam
Type of exam: written
Department involved:
Department of Repair, Reliability and Chemical Technologies
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Petar Kopchev, PhD, Dept. of Repair, Reliability and Chemical Technologies, tel. 888 228,
E-mail: chimia@ru.acad.bg
Abstract:
The course helps students obtain particular knowledge on the structure of substances, properties of metals and their alloys, corrosion, chemical phenomena and processes, directly connected with engineering. The lectures deal with the practical application of the processes and materials in the respective fields of modern engineering. The laboratory classes revise the theoretical aspects of these processes and model their use in engineering practice. The course is a prerequisite for the courses in Physics, Materials and Manufacturing Engineering, Strength of Materials, etc.
Course content:
Structure of substances. Kinetics of chemical processes. Chemical equilibrium. Chemical thermodynamics. Metals and alloys. Electrochemical processes. Dispersions. Surface phenomena. Review and classification of the main groups of organic compounds used in engineering practice. Isomerism of the organic compounds and its influence on their properties.
Teaching and assessment:
Laboratory classes provide students with the opportunity to receive visual notion about important theoretical issues, such as: chemical properties of metals and alloys, the work of electric cells, electrolysis, surface phenomena, etc. There is a test on basic topics at the beginning of each class, which could be either written or oral, with duration of about 15 minutes.

1024 Mathematics 1

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Algebra and Geometry
Faculty Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Petar Stoyanov, PhD, Dept. of Algebra and Geometry, tel: 888 453
Pr. Assist. Prof. Margarita Jakimova, PhD, Dept. of Algebra and Geometry, tel: 888 727
E-mail: mjak@ami.ru.acad.bg
Abstract:
This is a basic course in engineering education. It uses the mathematical knowledge from secondary school and extends it to a higher level. It is essential for the other mathematical subjects, Physics, Mechanics, other general and special engineering courses.
Course content:
Complex numbers and polynomials. Systems of linear equations and determrinants. Matrix calculus. Line in plane. Lines and planes in space – forms of determining and common positions. Linear space and linear operators. Second order curves and surfaces. Functions and sequences. Limits and derivatives. Basic theorems of differential calculus. Applications of derivatives for investigating functions. Indefinite integral – definitions and basic properties; methods for calculation - integration by parts, integration by substitution, integration of rational, irrational and transcendental functions.
Teaching and assessment:
The theoretical basis of the topics presented at lectures is acquired at seminars through solving problems; individual practising and reinforcing is accomplished by weekly assignments. Three written tests are administered and students with grades above 4.50 are exempt from an exam. Their grade is formed on the basis of an interview with the lecturer. Students are given six problems at the exam and they have to solve at least three to pass. Each student is required to do a course assignment. Its successful presentation at a seminar and regular class attendance are a necessary prerequisite to have the semester validated.

1038 Information Technologies 1

ECTS credits: 4
Weekly workload: 1lec+0sem+0labs+2ps+ca
Assessment: continuous assessment
Type of exam: test
Department involved:
Departament of Informatics and Information Technologies
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Margarita Teodosieva, MEng, PhD, Dept. of Informatics and Information Technologies,
tel: 888 464, E-mail: mst@ami.ru.acad.bg
Pr. Assist. Prof. Gradeo Toshev Gradeov, MEng, Dept. of Informatics and Information Technologies,
tel: 888 754, E-mail: gradeov@ami.ru.acad.bg
Abstract:
The course is aimed at introducing students to the computer and its components as a technical aid and to the most widely spread software products - operating systems, word processing systems, systems for processing information in spreadsheets, data bases, information systems, artificial intelligence systems, computer graphics systems, and data base management systems. The aim of the practical classes is to provide students with knowledge on the use of the most widely spread application software – Windows, Word, Excel.
Course content:
History and classification of computers. Hardware. Operating systems. Application software. Word processing systems. Spreadsheets. Databases: relation databases, data base management systems, data exchange and computer networks.
Teaching and assessment:
Lectures are carried out in blocks of two periods every other week. Practical classes are carried out in computer laboratories under the guidance of a lecturer. At the beginning of the class ten minutes are allotted to testing the students' knowledge either through a short written or oral test. Students' practical knowledge of the software product is monitored and assessed at the end of each part of the course. The course assignments require that the students demonstrate their ability to work individually with the respective software products. At the end of the semester students' theoretical competence is assessed by a test, including 100 questions, covering the whole material studied. The final grade is formed on the basis of the results from the main test, the grade for the student performance at the practical classes and the course assignments average grade.

2073 Material Science

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Materials and Manufacturing Engineering
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Prof. Rusko Ivanov Shishkov, MEng, PhD, Dept. of Materials and Manufacturing Engineering, tel. 888 204,
E-mail: rish@ru.acad.bg
Abstract:
This course studies the composition, structure and property connections in materials, which are used both in engineering and daily life, as well as the possibilities to change and redirect these properties in a certain way. Basic knowledge on physics and chemistry is needed. Students acquire useful knowledge and experience, which can be applied in other courses having something in common with material processing or new product construction.
Course content:
Main notions on the structure and properties of metals, dielectrical and semiconductor crystal materials. Structure analysing methods. One-, two-, and multi-component systems. Balance equilibrium diagrams of conditions. Regularity of crystallisation and transformations in hard condition – mechanisms and kinetics. Metastable conditions. Iron, steel and cast iron, copper, titanium, aluminum and their alloys. Other kinds of metal materials. Ceramics and metal ceramics. Polymeride materials. Composition materials.
Teaching and assessment:
Theoretical knowledge taught at lectures is assimilated, specified and enriched during the laboratory classes. They deal mainly with the material structure and the thermal methods of its change. Three tests are given during the semester. The test results are taken into consideration for final assessment.

0077 Technological Training Practice

ECTS credits: 3
Weekly workload: 0lec+0sem+0labs+4ps
Assessment: oral exam
Type of exam: oral
Department involved:
Department of Materials and Manufacturing Engineering
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Vasil Kostadinov, MEng, PhD, Dept. of Materials and Manufacturing Engineering,
tel: 888 308, 88 8781, E- mail: vkostadinov@ru.acad.bg.
Abstract:
The course aims at providing students with preliminary knowledge and practical skills needed for the main working processes in machine manufacturing, machine equipment and tool facilities. It also seeks to achieve a common knowledge foundation for students coming from various types of schools.
Course content:
The individual topics deal with fundamental practice-oriented data about the separate technological processes and operations from metal processing and mechanical engineering (metal casting, welding, plastic deformation and metal cutting).
The practical classes are connected with performing of manual and machine moulding operations, manual electric arc welding and cutting, open manual and machine forging, universal lathe work, drilling, crosswise-grating machine work, milling and performing of manual locksmith (fitter) operations.
Teaching and assessment:
The practical classes are held at the university workshop, where working places are prepared in advance. Students are divided in groups, each of which uses a separate working place. Testing is carried out through an oral exam. A certain practical assignment is carried out, as well as a short discussion of a theoretical issue.

0894 English, 0895 German, 0889 French, 0891 Russian

ECTS credits: 4 **Weekly workload:** 0lec+0sem+0labs+4ps
Assessment: continuous assessment **Type of exam**: written and oral
Department involved:
Departament of Foreign Languages
Faculty of Law
Lecturers:
Sr. Assist. Prof. Sevda Tsvetanova, MA, Department of Foreign Languages, tel.: 888 816,
E-mail: stsvetanova@ecs.ru.acad.bg
Sr. Assist. Prof. Tinka Karaivanova, MA, Department of Foreign Languages, tel.: 888 824,
E-mail: tkaraivanova@ecs.ru.acad.bg;
Sr. Assist. Prof. Rumiana Milanova, MA, Department of Foreign Languages,
E-mail: rmilanova@ecs.ru.acad.bg
Sr. Assist. Prof. Iliana Benina, MA, Department of Foreign Languages, E-mail: ibenina@ecs.ru.acad.bg
Abstract:
The foreign language module 1 is aimed at achieving communicative competence in the area of the subject specialism 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:
Making a request. Offering advice. Conditionals. Describing a process. Components and specifications. Describing graphs. Higher education. Writing a CV. Likes and dislikes. Announcements and messages (formal and informal). Making suggestions and plans. The grammar material is connected with the lexical topics and situations.
Teaching and assessment:
As in module 1 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.

0002 Informatics 2

ECTS credits: 4 **Weekly workload:** 2lec+0sem+0labs+1ps+ca
Assessment: continuous assessment **Type of exam:** written
Department involved:
Departament of Informatics and Information Technologies
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Margarita Teodosieva, MEng, PhD, Dept. of Informatics and Information Technologies,
tel: 888 464, E-mail: mst@ami.ru.acad.bg
Pr. Assist. Prof. Stojan Donchev Chernev, MSc, Dept. of Informatics and Information Technologies,
tel: 888 470, E-mail: stenly@ami.ru.acad.bg.
Abstract:
Students are introduced to one programming language. They work out elementary algorithms, which are aimed at the development of their logic thinking. The lecture topics present the main algorithmic structures –branch, cyclic recurrence, and multiple choices. Various types of data are analysed: scalar data, structured data, etc. The problems solved find application in engineering practice. At practical classes programmes are input and executed.
Course content:
Algorithms: main notions. Branch algorithms. Cycle algorithms. One-dimension arrays of algorithms. Two dimension arrays of algorithms. Structure of a Pascal programme. Types of data in Pascal. Data input and output. Branch statement, multiple-choice statement. Cycle statements. Types of arrays, work with arrays. Procedures and functions. Strings. Records. Files. Text files.
Teaching and assessment:
Lectures are carried out in blocks of two periods per week. The classes are practical with duration of two periods every other week. At the beginning of the class the assistant professor first explains the issues which students haven't been able to understand. Then they solve problems on algorithm compiling and write programmes. At the end of the class a short test is given.
The final course grade is formed on the basis of the grades of two course assignments, the grades of the tests and the impressions from the students' performance at the practical classes.

2068 Mathematics 2

ECT S credits: 5
Weekly workload: 3lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Mathematical Analysis
Faculty of Natural Sciences and Education
Lecturers:
Prof. Stepan Agop Tersian, PhD Maths, Dept. of Mathematical Analysis, tel. 888 226, 888 587;
Pr. Assist. Prof. Margarita Jkimova, PhD, Dept. of Algebra and Geometry, tel: 888 727,
E-mail: mjak@ami.ru.acad.bg
Abstract:
The course acquaints students with basic notions of mathematical analysis, necessary for further study of Mathematics Part III, Applied Mathematics, Theoretical Basis of Electrical Engineering, Mechanics, etc.
Course content:
Basic topics: Functions of more than one variable; Differential geometry in plane and space; Ordinary differential equations; Multiple integrals; Field theory; Numerical and functional series.
Teaching and assessment:
At lectures students are introduced to main theoretical issues, logically presented and supported with appropriate examples. The theoretical basis of the topics presented at lectures is consolidated at seminars through solving problems, having theoretical and applied character. Three written tests are administered during the semester. Final assessment is carried out by a written exam consisting of solving problems and answering theoretical questions. During the semester consultations are held - two classes per week. The requirement to have a semester validated is regular seminar attendance.

2069 Physics

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+0ps+p
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Physics
Faculty of Electrical Engineering, Electronics and Automation
Lecturers:
Assoc.Prof. Todorka Stefanova, PhD, Dept. of Physics tel. 888 814, E-mail: dora@ru.acad.bg
Assoc.Prof. Nadezda Marinova Nancheva, PhD, Dept. of Physics, tel. 888 219,
E-mail: nancheva@ru.acad.bg
Pr. Assist. Prof. Parvoleta Ivanova Docheva, PhD, Dept. of Physics, tel. 888 219,
E-mail: docheva@ru.acad.bg
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 classes aim at creating skills for experimental investigation of physical phenomena and solving of physical problems.
Course content:
Measuring physical quantities. Kinematics and dynamics of material point and rigid body. Interaction in nature. Work and energy. Mechanical preservation laws. Special theory of relativity. Molecular physics and thermodynamics. Transformation phenomena. Periodic processes and waves. Electric field and electric current. Magnetic field and electro-magnetic induction. Optical phenomena. Atoms, atom nuclei. Elementary particles. Contemporary investigation theories and methods in physics and practical applications of the physical effects and phenomena are emphasized.
Teaching and assessment:
Lectures give the main theoretical material, supported by some demonstrations of physical phenomena and processes. At the laboratory classes the students work independently and investigate particular physical phenomena. The acquisition 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. 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.

2070 Applied Geometry and Engineering Graphics 2

ECTS credits: 4
Weekly workload: 1lec+0sem+0labs+2ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Engineering Graphics
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikola Stoyanov Nikolov, MEng, PhD, Dept. of Engineering Graphics, tel: 888 491,
E-mail: nnikolov@ru.acad.bg
Abstract:
The subject analyses the rules for doing and making out plans, schemes and technical text documents; norms and instructions of Bulgarian and international standards concerning the drawing up of technical documents. It develops students' steric imagination and their skills to cope with technical documents. This subject is a prerequisite for further learning of other technical branches of science and doing course projects and a diploma paper.
Course content:
Different connections: threaded, key, spline and permanent connections. Drawing of a machinery piece – content, composition, images, dimensions, tolerance of dimensions, method of indicating surface texture, text information. Special documentation of some technical products. Drawings of assembled units. Item list. Text documents. Schemes. Building drawings.
Teaching and assessment:
The theory, presented at lectures by didactic means, provides the needed base for practical classes and course assignments. During practical classes problems are solved, instructions are given, examples are considered. Students are required to do a course assignment, which represents a number of plans with different images of steric objects.
The final course grade is formed on the basis of the grades of two tests and the course assignment results. The requirements to have a semester validated are regular lecture and seminar attendance and course assignment submission.

2071 Mechanics 1

ECTS credits: 5
Workload per week: 2lec+0sem+0labs+2ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Technical Mechanics
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Stoyan Stoyanov, MEng, PhD, tel.: 888 572, e-mail: sgstoyanov@ru.acad.bg.
Pr. Assist. Prof. Velina Bozduganova, MEng, tel.: 888 572, e-mail: velina@ru.acad.bg
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:
Particle kinematics. Translational, rotational, and plane rigid body motion. Relative motion of a particle. Equilibrium of a rigid body. Reduction of a system of forces. Equilibrium of a multi-body system. Equilibrium in the presence of friction. Gravity center.
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 methods learned in their course work, which is assigned individually to each student. The course work is controlled and graded by means of a grading system and it is submitted according to schedule. The students can participate voluntary in two tests to gain a higher grade. If a student has higher than 50% of the maximum grade, he or she can be exempted from examination. The exam consists of 4 questions and 4 problems. The grade gained in the semester is accounted for in the final assessment. Regular attendance of classes and course work submission are required for semester passing approval.

0542 Economics

ECTS credits: 4
Weekly workload: 3lec+1sem+0labs+0ps
Assessment: continuous assessment
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 course is concerned with the general problems, laws and categories of the contemporary market economy. Thus it creates a certain basis for the remaining economic objects. 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 concrete branch and functional economic subjects.
Course content:
Introduction – the economic system and the fundamentals of economic theory. Main economic issues. Market mechanism. Public sector and taxation. Demand and supply of the individual grades. Consumer demand and behavior. Manufacture, company assets and expenses. Imperfect competition and supplying. Price formation and incomes depending on production factors: Gross domestic product and economic growth. Economic cycles, unemployment and inflation. Microeconomic balance. Budget policy. Monetary policy. Foreign policy in the open-plan economics.
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. Continuous assessment is carried out. It includes two test assignments and student performance during the semester. Final assessment is the average of the above-mentioned components of evaluation.

0543 Exploitation Materials

ECTS credits: 2
Weekly workload: 1lec+0sem+1labs+0ps
Assessment: oral exam
Type of exam: written
Department involved:
Departmernt of Chemistry
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Petar Kopchev, PhD, Dept. of Repair, Reliability and Chemical Technologies, tel. 888 228,
E-mail: chimia@ru.acad.bg
Abstract:
The subject provides the main knowledge and skills for the essential theoretical and practical issues concerning the properties and application of fuels, lubricants, hydraulic oils, cooling and braking fluids. The course provides information on the classification and interchangeability of lubricants and oils. The influence of the exploitation materials on the machines and aggregates in tractors and automobiles is studied.
Course content:
Carburettior engine fuels. Diesel engine fuels. Motor oils. Transmission oils. Industrial and hydraulic oils. Greases. Cooling fluids. Antifreezing agents.
Teaching and assessment:
The subject is taught in two modes – lectures and practical classes. The lecture course includes eight topics for discussion. Demonstration experiments, photos, boards and slides are used during the lectures. The practical classes form practical abilities and habits of the students. Continuous assessment is carried out.

2254 Mathematics 3

ECTS credits: 4
Weekly workload: 2lec+1sem+0labs+1ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Numeric Methods and Statistics
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Ljuben Georgiev Valkov, PhD, Dept. of Numeric Methods and Statistics, tel: 888 466,
E -mail: vulkov@ru.acad.bg
Pr. Assist. Prof. Violetka Atanassova Kostova, Dept. of Numeric Methods and Statistics,
tel: 888 466, E -mail: vkostova@ru.acad.bg
Abstract:
The Mathematics Part III course is aimed at providing students with skills for processing data, obtained from experiments in the field of engineering, which requires the use of:

- Relativity theory mathematical apparatus;
- Mathematical statistics methods for experimental data processing;
- Programme products like Matlab and some methods for planning an experiment

Course content:
The course includes elements from: relativity theory, mathematical statistics, regression and correlation analysis, linear algebra numerical methods and mathematical analysis.
Teaching and assessment:
The training process is organised in lectures, seminars and practical classes. At lectures theoretical issues are presented and illustrated with appropriate sample problems, connected with the students' degree course. At seminars students solve problems, connected with engineering practice and requiring the application of the theory of relativity mathematical apparatus, as well as mathematical statistics. Each student is required to do an individual course assignment.
The final course grade is formed on the basis of the following formula:
Final course grade = 2/3 the grade of the test + 1/3 the grade of the course assignment.

2402 Strength of Materials 1

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Engineering Mechanics
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Ivelin Ivanov, MEng, PhD, Department of Engineering mechanics,tel. 888 224
e-mail: ivivanov@ru.acad.bg.
Assist. Prof. Nikolai Georgiev, MEng, Department of Engineering mechanics, tel. 888 478,
e-mail: ngeorgiev@ru.acad.bg.
Abstract:
The course provides students with a system of knowledge about the methods to assess by calculations the advisability, reliability, and effectiveness of the shapes and dimensions of structural elements. Previous knowledge in basic Mechanics (Statics) and Mathematics is necessary. The subject is fundamental for the further studies in other courses of the methods for design and concrete mechanical engineering objects.
Course content:
Introduction. Basic terms and principles, stress, deflections, strain. Internal forces in trusses. Tension and compression. Testing of materials, basic mechanical properties. Shear and crushing. Torsion of circular and noncircular bars. Moments of area of cross-sections. Plane bending and 3D bending, deflections in bending, deflected axis of a beam. Non-axial tension and compression. Buckling of struts.
Teaching and assessment:
During the seminars the students apply the theoretical basis of the topics, presented in the lectures, by solving problems for training. The students work out an individually assigned complex course assignment, which is graded on a two-week schedule. The students participate in three tests, which are graded. Final assessment is based on the grades of the tests and the grade of the course work defence. Regular attendance of classes and course work submission are the requirements for semester passing approval.

2529 Fluid Mechanics

ECTS credits: 6 **Weekly workload:** 3lec+0sem+2labs+0ps+ca
Assessment: exam **Type of exam:** written and oral
Department involved:
Department of Heat Engineering, Hydraulic and Pneumatic Equipment
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Ivanka Mitkova Jeleva, MEng, PhD, Dept. of Heat Engineering, Hydraulic and Pneumatic Equipment, tel: 888 582.
Abstract:
The course introduces students to the main relationships and physical treatment of the phenomena analysed in hydrostatics, kinematics and fluid dynamics from the perspective of their application in engineering practice. Basic knowledge of Mathematics, Physics, and Theoretical Mechanics is a prerequisite for acquiring knowledge of Fluid Mechanics and it in its turn is a prerequisite for studying hydraulic and pneumatic machines and drives, agricultural machines, internal combustion engines, etc.
Course content:
Main properties of fluids. Equilibrium of fluids. Kinematics and dynamics of ideal and real fluids. Hydraulic resistance and calculation of pipelines and channels. Resistance of streamlined bodies and wings. Liquid leakage from openings, end-pieces, jets.
Teaching and assessment:
The topics of the lectures provide students with the opportunity to get acquainted with the main laws of fluid mechanics preceding laboratory classes, during which the knowledge obtained is consolidated and its practical application clarified. For each laboratory class students work out a written report. The exam starts with a written part consisting of two questions from the course syllabus and a practical task to be solved, followed by oral testing. Students prepare a course assignment by stages, consisting of solving particular tasks from the material. studied The requirement to have a semester validated is submission of the course assignment and the written reports from the laboratory classes. The exam is in written form, including short answers to theoretical questions and a solution of a certain number of problems.

2530 Electrical and Electronic Engineering

ECTS credits: 6 **Weekly workload:** 3lec+0sem+2labs+0ps+p
Assessment: exam **Type of exam:** oral
Department involved:
Departament of Theoretic Electrical Engineering and Electrical Measuring
Faculty of Electrical and Electronic Engineering, and Automation
Lecturers:
Assoc. Prof. Georgy Rashkov Georgiev, MEng, PhD, Dept. of Theoretic Electrical Engineering and Electrical Measuring, tel. 888 412.
Abstract:
The course in Electrical and Electronic Engineering is part of the curriculum for the bachelor degree of non-electrical degree-courses. The aim of the course is to introduce students to main theoretical issues in the fields of Main Laws of the Theoretical Electrical Engineering, Electrical Measurement, of Electrical and Non-electrical Quantities, DC and AC Electrical Machines, Electronic semiconductors and circuits. Previous knowledge in Physics and Mathematics is necessary. The knowledge of Electrical and Electronic Engineering is a prerequisite for next semester courses and for preparing graduation work.
Course content:
Basic elements and magnitudes of electrical circuits: DC and AC, three-phase and magnetic circuits, electrical measurements of electrical and non-electrical quantities, DC machines, transformers, synchronous and induction AC machines. Main electronic devices: diodes, thyristors, transistors and operational amplifiers. Amplifiers. Digital networks.
Teaching and assessment:
The teaching process is organized in lectures and laboratory classes. Laboratory classes equip the students with practical knowledge. Each class starts with testing on basic topics, which could be either written or oral, and is of a15-minute duration. The purpose of the testing is to help the exam performance.

2531 Mechanics 2

ECTS credits: 4
Workload per week: 2lec+0sem+0labs+1ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Technical Mechanics
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Stojan Stojanov, MEng, PhD, tel.: 888 572, e-mail: sgstoyanov@ru.acad.bg.
Abstract:
Systematic knowledge of the methods and the ability to investigate the mechanical interaction and the motion of rigid bodies as well as dynamic processes in mechanical multi-body systems are built up in this course. The aim of the course is to enable the students to learn how to build up dynamic models of mechanical systems in order to solve practical engineering problems. Previous knowledge in Mathematics and Mechanics I is necessary. The course provides the basis for the following courses: Strength of Materials, Applied Mechanics, Machine Elements, Lifting and Transportation Machinery.
Course content:
Newton's law. Basic problems of particle dynamics. D'Alembert's principle. Linear oscillation of a particle. Relative motion dynamics of a particle. Dynamic characteristics of a particle and of a multi-body system. Theorems of the dynamics. Mass inertia moments and centrifugal inertia moments. Kinetostatics. Dynamics of a body in translational, rotational, and plane motion. Impact theory.
Teaching and assessment:
The theoretical basis and the methods of dynamics are explained in the lectures and modelling problems are solved. The students solve problems in the practical classes. There is a complex course work problem individually assigned to each student. The course work is scheduled for assessment, which is based on a specific grading system. The students can participate in up to 2 written tests included in the grading system. If at the end of the semester, the students have higher than the average grade, they can get this grade as final and be exempt from the exam. The exam consists of solving problems and answering short theoretical questions. The semester grade is accounted for in the final assessment. Regular attendance at practical classes and course work defence are required for semester passing approval.

2532 Technology of Materials

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Materials and Manufacturing Engineering
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc.Prof. Mladen Tzvetanov Trifonov, MEng, PhD, Dept. of Materials and Manufacturing Engineering,
tel. 888 206, E-mail: mtr@ru.acad.bg.
Abstract:
The course aims at supplying knowledge and skills on the fundamentals of the following technological processes – casting, plastic deformation and welding, as well as the fields of their application, where machine manufacturing and some non-machine manufacturing materials and goods are processed. Some general knowledge of physics, chemistry and strength of materials is a necessary prerequisite for studying this course. It is essential for studying other courses in the field of mechanical engineering technologies.
Course content:
Introduction: Main principles of the casting technology – a process diagram, working out of a casting form, casting of metal materials, special methods for getting mouldings. Main principles of the plastic deformation technology – a process diagram methods of volume and sheet deformation, special deformation methods, plastic deformation of metal materials. Main principles of welding technology – a process diagram methods of welding through melting and pressure special welding methods, thermal cutting, welding of metal materials. Fundamentals of other materials' processing: plastic and metal-ceramic materials.
Teaching and assessment:
Training is carried out through lectures and laboratory classes. Three tests are scheduled during the lectures. The final exam includes three written questions followed by an oral discussion. Final assessment is worked out on the basis of the tests and exam results.

2543 Machine Elements 1

ECTS credits: 6
Weekly workload: 3lec+0sem+1labs+1ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Ivan Georgiev Spasov, MEng, PhD, Department of Machine Science and Machine Elements, tel: 888 235, E-mail: igs@.ru.acad.bg.
Abstract:
The course performs the role of a linking unit between a number of general theoretical subjects / Mechanics, Strength of Materials, Theory of Machines and Mechanisms, Applied Geometry and Engineering Graphics, Materials and Manufacturing Engineering, Metrology and Measuring Equipment, etc./ and some engineering courses, included in the main module. The course introduces students to the theoretical fundamentals of general-purpose machine elements and to the methods for their calculation and construction.
Course content:
Volumetric and surface strength of machine elements. Fatigue limit. Types of joints: threaded, riveted, welded, key, clamp joints. Rotary motion elements: axes, shafts, friction and anti-friction bearings, controlled, uncontrolled and automatic couplings.
Teaching and assessment:
Lectures are presented to all groups of students of the degree course at one and the same time. Students' current work on the lectured material is controlled through two tests during the semester. Practical classes are carried out in a computer laboratory equipped with 12 modern computers. Students have a wide variety of didactic materials at their disposal: charts, a rich collection of standards and catalogues, samples of machine elements, slide and overhead projectors. Laboratory classes demonstrate visually a number of theoretical issues, already presented at the lectures. There is a test on basic topics at the beginning of each laboratory class and the results, processed on a computer, are presented in standard report forms. Students are required to do two individual course assignments during the semester: one on a screw-jack design and another one – on a friction clutch design. The course assignments are supervised at weekly consultations, monitoring the accomplishment of the graphic and calculation parts. Students defend both course assignments. The final continuous assessment grade on Machine Elements I is formed on the basis of the tests and course assignments results.

2544 Strength of Materials 2

ECTS credits: 4
Workload per week: 2lec+0sem+0labs+1ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Engineering Mechanics
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Nedka Stancheva, MEng, PhD, tel. 888 478, E-mail: nedka@ru.acad.bg.
Abstract:
The course provides students with a system of knowledge about the methods to assess by calculations the advisability, reliability, and effectiveness of the shapes, dimensions, and the material of structural elements. Previous knowledge in basic Mechanics and Mathematics is necessary. The course is fundamental for other educational courses related to design of specific machines.
Course content:
Introduction to the theory of stress and strain. Failure criteria. Energy methods (Castegliano's theorem) for deflection calculation in trusses. Statically indesemesterinate systems. Unit force method. Dynamic loading. Buckling of struts. Thick tubes and high-velocity rotating disks.
Teaching and assessment:
In the practical classes the students apply the theoretical basis of the topics, presented in the lectures, by solving problems for training. Some problems are well illustrated in the laboratory classes. The students work out an individually assigned complex course work, which is graded on a two-week schedule. The students can voluntarily participate in three tests and the grade gained, if it is above 50% of the maximum, leads to a final grade, so the student is granted the right to omit the exam. The exam consists of two problems and three questions. The semester grade is accounted for in the final grade of the exam. Regular attendance of classes and course work submission are the requirements for semester passing approval.

2545 Theory of Mechanisms and Machines

ECTS credits: 5 **Weekly workload:** 2lec+0sem+0labs+2ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Theory of Mechanisms and Machines and Materials Handling Machinery and Engineering Faculty of Agricultural and Industrial Engineering.
Lecturers:
Assoc.Prof. Petar Atanasov Koev, MEng, PhD, Dept. of Theory of Mechanisms and Machines and Materials Handling Machinery and Engineering, tel. 888 486, E-mail: pkoev@ru.acad.bg
Assoc.Prof. Ognian Alipiev, MEng, PhD, Dept. of Theory of Mechanisms and Machines and Materials Handling Machinery and Engineering, tel. 888 593; E-mail: oalipiev@ru.acad.bg
Assoc.Prof. Dimitar Ivanov Zafirov, MEng, PhD, Dept. of Theory of Mechanisms and Machines and Materials Handling Machinery and Engineering, tel. 888 486; E-mail: dzafirov@ru.acad.bg
Abstract:
This course introduces the students from this department to the methods of investigation (analysis) and projecting (synthesis) of machines and mechanisms according to structural, geometrical and dynamic indications. The course forms a basis for the studying of mechanism and machine with specific application.
Course content:
Structure and classification of mechanisms. Leverage (linkage), cam mechanism and gear transmission kinematics. Theory of gear trains with involute toothed gears. Kinetostatics of mechanisms. Dynamics of the machine unit (aggregate). Balancing of leverage mechanisms and rotors.
Teaching and assessment:
The essence of the methods of mechanism synthesis and analysis is presented at lectures. Specific problems for mechanism investigation are solved during the practical classes. Overhead projectors, computer simulations for motion passing and transformation, mechanism models in motion (metal, polymethilmethacrylate, paxoline for showing through a projector), as well as real constructions are used for presenting the matter in an appropriate real format. Assimilation is monitored through tests, assignments and an individual complex course project, which is presented and assessed continuously. Continuous assessment is formed on the basis of the test and the assignments.

3058 Theory of Mechanisms and Machines (TMM)– course project

ECTS credits: **2** **Weekly workload**: cp
Assessment: project defence **Type of exam**: oral
Department involved:
Department of Theory of Mechanisms and Machines and Hoist Equipment and Technologies (TMMHET) Faculty of Agricultural Mechanisation.
Lekturers:
Assoc.Prof. Ognyan Lyubenov Alipiev, MEng, PhD, Dept. of TMMHET; tel.: 888 593;
E-mail: oalipiev@ru.acad.bg;
Assoc.Prof. Tanya Petkova Grozeva, MEng, PhD, Dept. of TMMHET; tel.: 888 258;
E-mail: tgrozeva@ru.acad.bg;
Assoc.Prof. Petar Atanasov Koev, MEng, PhD, Dept. of TMMHET; tel.: 888 486; E-mail: pkoev@ru.acad.bg ;
Abstract:
The goal of the course project is to help students acquire and rationalize the general methods of research (analysis) and design (synthesis) of different types of mechanisms and machines. It aids the students in building practical skills to discover the main features of mechanisms and prepares them for independent solving of specific engineering problems. The project in TMM is the first stage of machine-building design, connecting the knowledge acquired in a number of general science courses with the course design of real technical objects, studied in specialised courses.
Course content:
A machine unit is designed in which the driving and the operating machines are an electric motor and a flat leverage mechanism respectively, joined through involution gear. The course project includes several stages. It consists of a calculation part, structured as explanatory calculation notes and a graphic part with a specified number of blueprints.
Teaching and assessment:
The course project is developed individually, using detailed methodological guidance and calculation and simulation software developed for this purpose by the Department staff. Students receive an individual assignment and a weekly schedule for reporting the results of the successive stages at the beginning of the semester. The work is carried out both at home and in the project lab, equipped with modern computers, multimedia, and a number of models in motion and real constructions of mechanisms. The calculation and graphic part of the project solutions are controlled in stages and evaluated based on their reliability and the way they have been explained, as well as on the analysis of the results obtained. The final grade for the project is formed after a public defence.

2546 Heat Engineering

ECTS credits: 5 **Weekly workload:** 2lec+0sem+2labs+0ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Department of Heat Engineering, Hydraulic and Pneumatic Equipment
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Valentin Vassilev Bobilov, MEng, PhD, Dept. of Heat Engineering, Hydraulic and Pneumatic Equipment, tel: 888 844, E-mail bobilov@ru.acad.bg.
Abstract:
The course consists of three parts: Technical Thermodynamics, Heat Transfer and Applied Heat Technology. The aim of the course is to provide future specialists with the necessary engineering knowledge of the main laws of thermodynamics and heat transfer and to create practical skills for solving real application technical problems from the areas of drying, refrigerating, heating and ventilation equipment. The course syllabus also includes topics from the field of non-conventional energy sources and the systems for utilization of waste heat flows.
Course content:
Main notions: thermodynamic system, heat equilibrium, work and heat of processes. Main laws of ideal gas. State equation. Mixtures of indifferent ideal gases. First law of thermodynamics. Main thermodynamic processes – constant-volume, constant-pressure, constant temperature, adiabatic and polytropic processes. Second law of thermodynamics. Karno's cycling process. Serviceability of thermodynamic systems. Real gasses. Van der Vaals' equation. Water steam and water steam processes. Renkin's cycle. Humid air thermodynamic properties. Leakage of gasses and steam trough a nozzle and a diffuser. Throttling. Cycles of working machines and heat motors. Cycle of a compressor refrigerator machine. Heat conduction – Furie's equation. Convection heat exchange – Newton-Rihman's equation. Radiant heat exchange. Laws of radiant heat exchange. Complex heat exchange and heat transfer. Heat exchanging appliances. Fuels and combustion processes. Steam and water heating boilers. Heat balance and efficiency coefficient. Steam and gas turbines. Heat energy consumption for technological processes, heating, ventilation and air-conditioning. Alternative and secondary energy sources.
Teaching and assessment:
Lectures provide students with theoretical knowledge. Some of the laboratory classes are carried out on laboratory installations, others on real industrial objects. 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. The exam is in written form followed by oral testing. The final grade is a complex one, based on the results of the exam and the student's performance at the laboratory classes.

2555 Manufacturing Technologies

ECTScredits: 5 **Weekly workload:** 3lec+0sem+2labs+0ps+p
Assessment: exam **Type of exam:** written
Department involved:
Department of Machine Tools and Manufacturing
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc.Prof. Stefan Veselinov Vichev, MEng, PhD, Department of 'Machine Tools and Manufacturing',
tel: 888451; E-mail: svichev@ru.acad.bg
Assoc. Prof. Mihail Kolev Karshakov, MEng, PhD, Department of 'Machine Tools and Manufacturing',
tel: 888508; E-mail: mkarshakov@ru.acad.bg
Abstract:
The course gives general information about and skills in the methods, tools, and machines for machining various machine parts. It reviews the design stages of technological processes.
Course content:
General information and theoretical foundation of the metal cutting process. Metal cutting machines and tools. Methods and processes of cutting– turning, scraping, slotting, drilling, hole-enlarging, reaming, pull-broaching, push-broaching, boring, milling, grinding, thread-broaching, gear-cutting. Design of machining technological processes.
Teaching and assessment:
The lectures provide the students with theoretical information. The students' individual preparation, based on recommended reference materials and their involvement in the laboratory clases are of great importance. In order to optimise the students' preparation, the exam questions are divided into three groups of difficulty. Depending on the group of questions the student falls in, he/she gets the corresponding grade.

2556 Structure of Internal Combustion Engine and Vechicles

ECTS credits: 3 **Weekly workload:** 0lec+0sem+0labs+4ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Automobiles, Tractors and Fork-lift Trucks and Internal Combustion Engines
Faculty of Automotive Engineering and Transport
Lecturers:
Assoc. Prof. Totju Totev, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 888 528, E-mail: totev@ru.acad.bg
Pr. Assist. Prof. Kiril Iliev Hadjiev, MEng, PhD, Dept. of Automobiles, Tractors and Fork-lifts tel.: 888 332;
Assoc. Prof. Tsonyu Ivanov Petkov, MEng, PhD, Dept. of Internal Combustion Engines, tel.: 888 335
Abstract:
The course provides knowledge of the structure and the working principles of Internal Combustion Engines and Vehicles also their mechanisms and systems. The knowledge of maintenance, safety work conditions and conducting is included. This course is a prerequisite for other courses such as Fundamentals of Internal Combustion Engines, Automotive Engineering 1 etc.
Course content:
Overall structure design and working. Crank-Slider Mechanism. Gas exchange mechanism. Cooling system. Oil system. Fuel supplying system for gasoline engines. Fuel supplying system for compression ignition engines. Fuel supplying system for LPG and CNG engines. Ignition systems. Starting systems. Electrical systems and equipment. Introduction to automobile and tractor construction. Transmissions. Automotive clutch. Gear box. Continuous transmissions. Cardan couplings. Drive axles. Frame, wheels and suspension of wheeled vehicles. Frame, suspension and steering of chain vehicles. Work equipment of automobiles and farming machinery.
Teaching and assessment:
Rich illustrative material and working models of different mechanisms and systems of automobiles and farming machinery support the teaching. Practical classes provide time for individual work. The continuous assessment grade is based on two written tests and a final interview.

2558 Materials Handling Engineering in Transport

ECTS credits: 4 **Weekly workload:** 2lec+0sem+2labs+0ps
Assessment: continius assessment **Type of exam**: written
Department involved:
Departament of Theory of Mechanisms and Machines and Materials Handling Engineering
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Georgi Getsov Kenarov, MEng, PhD, Dept. of Theory of Mechanisms and Machines and Materials Handling, tel: 888 239, 888 664, gkenarov@ru.acad.bg.
Abstract:
The course familiarizes students of the TRANSPORT ENGINEERING degree course with the structure, technical characteristics, calculation and selection criteria for materials handling machinery needed for the mechanisation of transportation and storing of goods. The course also deals with the machinery and technology applied in loading and storing of various types of goods in road, railway, port and other transport and warehousing units, terminals and centres. The study of the course is based on knowledge acquired from general engineering courses. The newly-acquired knowledge is a prerequisite for studying the specialist subjects, preparing the diploma paper and the diploma practice.
Course content:
General information about materials handling. Transport and warehousing characteristis of loads. Packages, pallets and containers. Loading devices. Loading machines with periodic action – lifting jacks, loading platforms and boards, traveling bridge cranes for loose goods and containers, truck cranes and manipulators, self-propelled loaders, fork-lift trucks, bucket cranes and gate loaders. Auxiliary devices and facilities. Loading, unloading and warehousing processes and systems for loose, single unit, packed, palletized and container goods. Operation and technical safety of materials handling machinery.
Teaching and assessment:
Lectures acquaint the students with the main topics of the course. Laboratory classes are used to conduct functional and experimental research of materials handling machinery. Some of the classes are conducted as visits to terminals and warehousing centres. On analysing the results, the students prepare a report. The exam is written and starts with two questions followed by oral testing and discussion. Final assessment is based on exam results and continuous assessment grades for student performance in the practical classes.

2559 Internal Combustion Engines

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Hristo Stanchev, MEng, PhD, IC Engines Department, tel: +359 82 888 373,
E-mail: hstanchev@ru.acad.bg.
Abstract:
The core of the course is Theory, Dynamics, Construction, Testing and Characteristics of ICE.
It is based on knowledge in the field of Thermodynamics, Theoretical Mechanics, and Machine Design, Fluid Mechanics. It dives grounds for studying of other courses (Maintenance and Repair of Transport Vehicles, Automobiles, Theory of ICE, Construction and design of ICE, Testing of ICE and Combustion stations, Automatic adjustment of ICE and engineering practice.
Course content:
Fuels and chemical reactions for combustion. Real cycles of ICE. Engine Processes. Indicator & Effective performances. Emission. Working characteristics. Mixture formation and fuel systems. Governors. Kinematics & Dynamics. Basis of calculation and construction of ICE.
Teaching and assessment:
The multimedia is used in lectures. There is a test after every 1/3 part of lectures and a test before every practical (laboratory) class. There is a course assignment, devoted to thermal calculation of an ICE.
The final grade is determined on the basis of continuous assessment, course assignment, laboratory class and examination grade.

2560 Automotive Engineering 1

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Typeof exam: written
Department involved:
Department of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Ivan Iliev Evtimov, MEng, PhD, tel.888 527, e-mail: Ievtimov@ru.acad.bg;
Assoc. Prof. Borislav Georgiev Angelov, MEng, PhD, Department of Automobiles, Tractors and Fork-lift Trucks, tel. 888457, E-mail: bangelov@ru.acad.bg.
Abstract:
The course acquaints the students with the theory of movement of automobiles and tractors in various working conditions as well as with their operational characteristics. What is also needed is knowledge about the internal combustion engines, theoretical mechanics and mathematics. The discipline is a prerequisite for studying design and creating new machines, as well as for their exploitation and maintenance.
Course content:
Basic exploitational characteristics and working conditions, transmission of the energy from the motor towards the track system, dynamics of the wheeled and chained machines, dragging and dynamic characteristics and energy economy, braking characteristics, stability of movement, management and roadability of the machines.
Teaching and assessment:
Lectures clarify the theoretical basis of the topics taught. The laboratory classes are conducted on special devices which enable the students to study the basic characteristics of automobiles and tractors.Course work is individually done on the theory of machines. Student performance is monitored by preparing and defending reports on the laboratory classes and the overall defence of the course assignment. Semester validation is given after fulfilling all the requirements of the laboratory classes and successfully defending the course assignment. The exam consists of two questions to be answered in written form which are later assessed.

2561 Machine Elements 2

ECTS credits: 3 **Weekly workload:** 1lec+0sem+1labs+1ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc.Prof. Ivan Georgiev Spasov, MEng, PhD, Dept. of Machine Science and Machine Elements,
tel. 888 235, E-mail: igs@.ru.acad.bg.
Abstract:
This course is a linking unit among a number of general theoretic courses such as Mechanics, Strength of Materials, Theory of Mechanisms and Machines and some technical courses included in the main course module. The educational course is aimed at studying the theory of the machine elements with a general use and their calculation and construction methods.
Course content:
Mechanical gears. Cylindrical involute tooth gears – geometry kinematics, calculation of contact strength and bending. Planet, wave, conical, screw and worm gears. Reduction gears. Chain and belt gears. Rubbing gears and variable-speed drives.
Teaching and assessment:
Lecture material and the way it is taught is similar to the one described in Machine elements – part I. The practical classes are taught in groups in a computer room. Students use boards, a set of standards and brochures, model samples, overhead projectors. The laboratory classes are based on various topics. There are tests for incoming and continuous control. The practical results are computer-processed and are singled out in reports. The course project is computer-controlled in consultation classes each week. Issues are individually solved through projecting cylindric, conic, worm and other reduction gears. The total assessment of this subject includes students' work on the course assignment of Machine elements – part II and is formed on the basis of a written exam which includes two issues for discussion.

3059 Machine Elements 2 – Course Project

ECTS credits: 2 **Weekly workload:** cp
Assessment: defending a project **Type of the exam:** oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Every lecturer in the Department of Machine science and machine elements teaches the course project:
Assoc.Prof. Ivan Georgiev Spasov, MEng, PhD, Dept. of Machine Science and Machine Elements,
tel. 888 235, E-mail: igs@.ru.acad.bg.
Abstract:
The course project aims at developing the skills in deciphering engineering drawings, schematising of constructions and their loads and also stabilising the habits of strength calculation of the elements, acquired from the course assignment. The course is a connection between the courses in Engineering graphics and course projects in specialized courses.
Course content:
During the development of the course project basic questions in connection to the design and strength calculations of complex machine elements as shafts, housings, cylindrical, bevel and worm gears are answered.
Teaching and assessment:
The course project is held through weekly consultations, in the modern, computer equipped hall 305B. The project assignments are individual and vary in structure and initial parameters. These are assigned through specific forms, which also involve recommendations for the way and range of their execution. The project consists of two parts – calculations and graphs. The graphs involve: general drawing, list of components and working drawings of non-standard details. The calculations are arranged as an explanation and calculation note. The project goes trough several stages. The lecturer certifies each stage after a consultation. When the project is done, the student defends it in front of an audience. The defense is being evaluated and the grade, taking into consideration also the evaluations of the course assignments, is formed as a final grade for the course Course project for Machine Elements.

2657 Technical Documentation Using AutoCAD

ECTS credits: 1
Weekly workload: 0lec+0sem+0labs+1ps+p
Assessment: oral exam
Type of the exam: written
Department involved:
Department of Engineering Graphics
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikola Nikolov, MEng, PhD, Dept. of Engineering Graphics, tel. 888491.
Course Description:
Study of fundamentals and principles (Bulgarian and International) of technical drafting practices used in the preparation of engineering drawings and other technical documents. Introduction to the process of computer-aided drafting with AutoCAD application software. The course is designed to improve students' technical proficiency through the use of a computer as a tool to prepare modern technical documents. Skills and knowledge gained from this course are essential in the field of engineering, as well as in other technical areas of study.
Class content:
Engineering drawings of mechanical pieces, engineering drawings of joined units, AutoCAD software
Teaching Method:
Students are exposed to academic material through lectures, practice classes, and the completion of an independent project. Class lectures focus on the discussion of textbook theory. They are structured to provide the basic knowledge needed for successful completion of assigned practice exercises. During scheduled practice classes, students learn how to use AutoCAD software to solve drafting problems. Throughout the semester, each student is assigned an independent course project which consists of a set of technical drawings to be prepared with the help of a computer. The final course grades are determined from 2 period examinations and the independent project. Following official academic policy, successful completion of the class requires the completion of the independent course project as well as satisfactory attendance of lecture and practice classes.

2807 Metrology and Measurement Equipment

ECTS credits: 4
Workload per week: 2lec+0sem+2labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Machine Tools and Manufacturing
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc.Prof. Branko Dushkov Sotirov, MEng, PhD, Department of Machine Tools and Manufacturing,
tel: 888 493, E-mail: bsotirov@ru.acad.bg.
Abstract:
The course gives fundamental engineering and technical knowledge for the students in Transport Machinery and Technologies, Hydraulic and Pneumatic Technologies, and Agricultural Machinery and Technologies. Through various teaching methods it enhances their specific knowledge and practical skills in areas such as Theoretical and Legislative Metrology, Methods and Equipment for Measuring of Machine Parts, and Tolerance Design.
Course content:
Theoretical Bases of Metrology. Legislative Bases of Metrology. Basic Metrological Properties of Measurement Devices. Selection of Measurement Devices. Primary Transformers Used in Measurement Devices. Measurement of Length. Design of Geometrical Tolerances for Machine Parts. Methods and Measurement Devices for Cylindrical, Conical, Thread, Key and Groove Surfaces. Control of Gears. Measurement of the Quality of a Process.
Teaching and assessment:
Lectures: Case-based and including the basic principles for tolerance design for machine parts. **Laboratory classes**: Each student is given the opportunity to measure specific typical machine parts with general and special measurement devices and to work with various standards for machine parts' geometrical parameters. Each laboratory class starts with a test and includes the preparation of a report.
Course assignment: Based on a specific design drawing each student designs the fittings in the drawing, specifies and notes on a chosen draft drawing of a machine part the geometrical tolerances and chooses a measurement method and device. The course assignment includes explanatory notes and drawings.
Continuous assessment: 50% of the final grade is based on the written exam grade, 25% - technical measurements exam grade, and the last – 25% course assignment grade. None of those grades can be poor (2). The current assessment grade is taken into account if needed.

2831 Electric and Electronic Equipment of Automobiles and Tractors

ECTS credits: 4
Weekly workload: 2lec+0sem+2labs+0ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Valentin Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 373.
Abstract
The course deals with the principles of operation, theory, construction, characteristics and partly maintenance features of the machines, devices and apparatuses of the electric and electronic equipment in automobiles and tractors. This knowledge is necessary for designing and maintaining automobiles and tractors and it is a prerequisite for the successful study of related courses. It is based on profound knowledge of Electrical Engineering and Electronics.
Course content:
General information about the electric equipment of automobiles and tractors. Starting accumulator batteries. Generators. Starters. Requirements to the ignition system. Battery and electronic – ignition systems. Magnetos. Electric control systems of ignition timing. Audible and light signalling devices. Lighting system. Additional electric apparatuses. Electric equipment of electrical cars – a traction accumulator battery, electric motors and commutation equipment.
Teaching and assessment:
Slides are employed as visual aids for the material taught. Problematic questions are put forward for discussion. There is a test on each topic. Laboratory classes are on basic themes and their duration is 4 h. The experimental data are worked up and the reports are formed during the practical classes. The students get a grade at the entrance test and for the fulfillment of each exercise. Final assessment is based on all the grades received and should these be positive, the student can be exempt from examination.

3037 Automotive Engineering 2

ECTS credits: 5
Weekly workload: 2lec+0sem+1labs+0ps+ca
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Automobiles, Tractors & Fork-lift trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc.Prof. Rusi Getsov Rusev, MEng, PhD, Department of Automobiles, Tractors and Fork-lift trucks,
tel: 888524, E-mail:rgr@ru.acad.bg;
Assoc. Prof. Rosen Ivanov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-lift Trucks,
tel.: 082 888 524, E-mail: rossen@ru.acad.bg.
Abstract:
The Automotive Engineering II course teaches the main dynamic processes in machine aggregates of the transport vehicles, caused by different constructive and operational factors and by working proceedings in the main mechanisms. The discipline is aimed at giving scientific ideas about the dynamic loading of the transport vehicle constructions and the effect it has on their operational characteristics.
Course content:
Introduction into the dynamics of automotive engineering. Theoretical basis of the dynamic processes in automotive mechanic systems. Automobile movement flaccidity. Nonlinear mechanical systems in the automotive engineering. Elastic hanging of the force aggregates. Trajectory and course stability of automobiles.
Teaching and assessment:
The basic knowledge about the course is acquired through lectures, where students are shown slides, transparencies, and suitable video-materials. Knowledge is consolidated by individual work during the laboratory classes, which are held in sub-groups. Students present a report for each class and defend them. The preparation and the carrying-out of the exam enables the students to encompass the whole range of the course and the links between the separate topics. Only students who have presented and defended all of the reports on all of the laboratory classes are admitted to the exam. Final assessment is based on the overall performance of the student during the semester that includes his/her participation during lectures and the quality of their laboratory class reports.

3038 Maintenance and Repair of Transport Machinery

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps+p
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Vassil Antonov Stoianov, MEng, PhD, Dept.of Repair and Reliability, tel. 888 480,
E-mail: vas@ru.acad.bg;
Pr. Assist. Prof. Alexander Jordanov Stoianov, MEng, PhD, Dept.of Transport, tel. 888 231,
E-mail: AStoianov@ecs.ru.acad.bg.
Abstract:
The subject of Maintenance and Repair of Transport Machinery provides certain scientific and practical knowledge in the field of machine reliability and technical diagnostics. It takes into consideration the methods and devices used in desemesterining the technical condition of transport machinery and the balance resource of the separate units and aggregates.
Course content:
Changes of technical condition of transport machinery during its operation. Wearing and damaging of machine components and units. Purpose and essence of reliability and diagnostics of transport machinery. Desemesterining of the balance resource. Diagnostic technologies.
Teaching and assessment:
Lectures are delivered in a traditional format. Video films are offered to the students' attention. Laboratory classes are held on real stands and machines. The exam is written and oral based on lectures and laboratory class content.

3039 Dynamics, Design and Calculation of Internal Combustion Engines

ECTS credits: 7
Weekly workload: 4lec+0sem+2labs+1ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Emil Ivanov Marinov, MEng, PhD, Department of Internal Combustion Engines,
tel: 888 331, E-mail: EMarinov@ru.acad.bg.
Abstract:
The subject of the course is associated with the study of kinematics and dynamics of crank slider mechanisms. The students obtain knowledge about the calculation and design of internal combustion engines elements and systems. In order to study this course the students need to have profound knowledge in courses like theoretical mechanics, theory of machines and mechanisms, structure of materials, strength of materials, elements of machines and engineering drawing. The course inhances the design and research skills of the students in the field of internal combustion engines.
Course content:
Kinematics and dynamics of crank slider mechanisms. Counterpoising. Torsional vibrating of the crank shaft. Noise and vibrations. Methods and tools for engine design. Design and calculation of crank slider mechanisms. Gas exchange mechanisms and engine systems.
Teaching and assessment:
The basic theories in engine design and calculation are included in the lecture courses. The laboratory classes give the opportunity for self study with research equipment and laboratory test stands. The practical classes reinforce the acquisition of knowledge. The course project is a complex task in designing and calculating an engine.
The exam is written and oral. The final grade is given after a talk with the students. The course project is defended and the grade received is individual.

3060 Dynamics, Design and Calculation of Internal Combustion Engines – Course project

ECTS credits: 2
Weekly workload: cp
Assessment: exam
Type of exam: project
Department involved:
Departament of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Emil Ivanov Marinov, MEng, PhD, Department of Internal Combustion Engines, tel: 888 331,
E-mail: EMarinov@ru.acad.bg.
Abstract:
The course is associated with profound study of topics concerning dynamics and design of internal combustion engines. The purpose of this course is to improve the design skills of the future specialist and to provide knowledge on the methods and the sequence of calculation and design of engine elements, units and systems and their position. The students also obtain practice-oriented skills when they have to choose or change materials, fits and machining of the engine elements surfaces. The course is based on knowledge of Theory of Internal Combustion Engines, Strength of Materials, Theoretical Mechanics, Machine Elements, Engineering Graphics, Structure of Materials and Hydraulics.
Course content:
The students study the basic methods for design and calculation of Internal Combustion Engines using prototype engine. The explanation paper contains thermodynamic calculation of the engine cycle, kinematics and dynamics calculations, strength calculations and choosing a prototype engine.
The drawing part deals with charts from thermodynamic, kinematic and dynamic calculations, as well as longitudinal and cross sections of engines, drawings of units and parts.
Teaching and assessment:
The project development is carried out according to weekly programme of tutorials. The training process passes almost as individual training.
At the end of the semester the project concludes with oral defense and grade.

3040 Theory of Internal Combustion Engines

ECTS credits: 7
Weekly workload: 3lec+0sem+2labs+0ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Kiril Nikolaev Barzev, MEng, PhD, Department of Internal Combustion Engines, tel. 888 432,
E-mail: barzev@ice.ru.acad.bg.
Abstract:
The course builds up basic knowledge of the processes going on in internal combustion engines. Students have to use this knowledge and relevant analytical methods in order to estimate the fuels, working conditions and design characteristics influencing the engine performance and efficiency. Course prerequisite is knowledge of engine structure, fluid mechanics, thermodynamics and introduction to internal combustion engines. The course is a prerequisite for studying design methods, automatic control, exhaust emissions reduction and engine modeling during the next semesters of study.
Course content:
Introduction. First and second thermodynamic law of fuel-air mixtures. Thermodynamic cycles of heat engines and particularly these of internal combustion engines. Gas exchange processes in internal combustion engines. Mixture formation and combustion in spark-ignition and compression-ignition engines. Engine heat transfer. Internal combustion engines operating parameters and influencing factors. Methods of improving engine performance.
Teaching and assessment:
The main topics delivered during lectures are assimilated through the provision of course work and laboratory classes. Every student receives individual course work in which he/she estimates engine efficiency and fuel saving for four different fuels. The test is written. The score is finalised after a conversation with the student.

3041 Design of Automobiles and Tractors

ECTS credits: 7 **Weekly workload:** 4lec+0sem+2labs+1ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Automobiles, Tractors and Fork-lift Trucks, Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Dimitar Jordanov Stanchev, MEng, PhD, Dept. of Automobiles, Tractors and Fork-lift Trucks,
tel. 888 527 and 888 545, E-mail: dstanchev@ru.acad.bg;
Assoc. Prof. Ivan Iliev Evtimov, MEng, PhD, tel.888 527, e-mail: Ievtimov@ru.acad.bg.
Abstract:
The foundation of automobiles and tractors (AT) design is laid by studying this course; it enables the students to acquire skills for analysis of compounding, transmissions and systems of AT; the students obtain the necessary knowledge and skills for proper usage and maintenance of the AT, for self study and teamwork alike. The course is a prerequisite for learning other specialised courses and preparing the diploma project.
Course content:
Introduction. Methodology of design. AT design. Transmissions. Systems for additional power outlet. Based loading and calculating systems. Loading of transmission elements. Connectors. Transmission boxes. Hydraulic transmissions. AT steering. Moving systems. Drives bridges. Brakes. Suspension of AT. Trends in the development of AT.
Teaching and assessment:
The lecture material is illustrated at the laboratory and practical classes and through the course project. Each class uses personal discussion with the students for the purpose of providing assistance in forming the skills needed in their future career. The semester is validated on the basis of regular attendance and student performance. The exam covers the material from lectures and laboratory and practical classes. The questions are answered in written form and presented orally in the presence of the lecturer and his assistant.
The course provided tests for input and periodical control through the semester, teaching documentation and learning manuals are uploaded in the university computer network, training manuals are elaborated for self study purposes.

3061 Design of Automobiles and Tractors – Course project

ECTS credits: 2 **Week classes:** cp
Assessment: current control **Type of exam:** oral presentation
Department involved:
Departament of Automobiles, tractors and cars, Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Dimitar Stanchev , MEng, PhD, tel: 888545, E-mail: dstanchev@ru.acad.bg.
Abstract:
The objective of the course project in Design of Automobiles and Tractors is to help create skills of the students to work on their own, to analyze creatively, and to design optimal constructions and elaborations of automobiles and tractors. The beginning is the selection of a scheme - the load and calculation regimes are to be determined. An analysis of principle and concrete constructions of units and aggregates is carried out. The main stages of the calculation and regulation of the units, as well as the necessity and the methods of the maintenance conditions are determined. The prerequisite subjects are: Mathematics, Technical Drawing, Strength of Materials, Theory of Automobiles and Tractors. The outcomes of the knowledge acquired through this course are a foundation for other specialized courses and the Bachelor Thesis.
Course content:
The course project begins with the assignment for the elaboration. The topic of each assignment is individual. It includes the tasks and the deadlines for their fulfillment. The execution of each task is assessed separately. The project includes a text and drawings. There are textbook and e-learning tutorials. The objective of the project is the students to acquire knowledge and skills for independent learning and creative working. The project consists of about 30 pages covering the text part and drawing part of 2 different drawing sheets A1 format. They include construction of an automobile or a tractor, kinematics scheme and design elaboration.
Teaching and assessment:
At the beginning of the semester each student receives and assignment, which includes the topic, the tasks and the deadlines for each week. The students can work in a room for design process. The main part of the project, if fulfilled, is implemented by the students in the library and in the computer rooms. Each design stage is assessed. The students work on their own and regularly throughout the whole semester. The final approval of the course project is given according the inner rules of the study activities of the university. At the end of the semester the activities of the students during the semester are assessed. After the project is finished, the students prepare for an oral presentation and receive the final assessment grade for the course.

3042 Electric and Engine Trucks

ECTS credits: 7
Weekly workload: 3lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written
Department involved:
Deparment of Automobiles, Tractors and Fork-lift Truck
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Ivan Iliev Evtimov, MEng, PhD, Department of Automobiles, Tractors and Trucks,
tel. 888 527, E-mail: ievtimov@ees.ru.acad.bg.
Abstract:
The purpose of the course is to give the students knowledge of the principles and methods of vehicle engineering and its operational systems. The student will also acquire the expertise to analyze the established constructions and prototypes, to calculate the geometrical and material durability of components positioning.
Course content:
Classification and implementation of electric and engine trucks. Technical parameters. Construction of electrical and engine trucks. Transmission. Control. Control system. Braking system. Lifting systems. Horizontal load movement system. Interchangeable operating adapters/instruments. Hydraulic system. Electric system of electrical trucks.
Teaching and assessment:
The fundamentals of the course are taught during classes. Student attendance and participation during laboratory classes facilitate the comprehension of the theoretical studies.
The final grade is based on the results from the written final exam and on the student's participation during laboratory classes and his/her preparation of a semester paper.
Lecture material is taught by means of modern methodology, while the samples are based on up-to-date technologies of development of vehicles. The laboratory classes take place in the specially designed laboratories of the Department of Automobiles, Tractors and Trucks of the University. During the development of the semester paper, the student is given the opportunity to imply the acquired theoretical knowledge throughout the course.

3044 Traffic Safety

ECTS credits: 4
Weekly workload: 2lec+0sem+1labs+0ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Eng. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Pr. Assist. Prof. Jivko Gelkov, MEng, tel: 888-609, E-mail: JGelkov@ecs.ru.acad.bg.
Abstract:
The aim of the subject is to give the students knowledge on traffic safety problems, to study the estimation methods and traffic safety methods and measurements. The methods for traffic accidents reconstructions are presented in detail. Previous knowledge of mechanics, transportation infrastructure, vehicles and vehicle diagnostics is necessary. The subject is an essential contribution to the formation of transport engineers.
Course contents:
Traffic safety problems. Structure and functions of the Driver – Vehicle – Transport infrastructure – Environment system.
Vehicle safety, safety of transport infrastructure elements. Transport accidents. Methods for estimation of traffic safety and transport risk. Technical expertise of traffic accidents (traffic accidents reconstruction).
Teaching and assessment:
Lectures are taught in the traditional format using appropriate teaching aids. The laboratory classes are practice-oriented. Three written tests are conducted in order to evaluate students' knowledge of the subject.
The course work grade is included in the final grade too.

3045 Transport Marketing

ECTS credits: 4
Weekly workload: 2lec+0sem+1labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc.Prof. Velizara Ivanova Pencheva, MEng, PhD, Department of Transport, tel.: 888 825,
E-mail: VPencheva@ecs.ru.acad.bg.
Abstract:
The aim of the subject is to give the students theoretical knowledge and practical skills, concerning the marketing activity and the transportation service.
Course contents:
Gradeeting environment. Demand and supply - special features. Creation of a transport product. Markets. Rates and prices. Modes of transport and channels used for distribution of goods. Marketing information system and surveys. International transport marketing.
Teaching and assessment:
The main subject topics delivered during the lectures are assimilated through the provision of specific examples from transportation practice.The lectures provide the knowledge needed to conduct the laboratory classes which are used to solve specific problems of gradeeting.
Final assessment is based on the result from the exam and the overall student performance during the semester.

3046 Technical Safety

ECTS credits: 2
Weekly workload: 2lec+0sem+0labs+0ps+p
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, MEng, PhD, Department of Ecology and Environmental Protections,
tel: 888 481, E-mail: vtomov@ru.acad.bg.
Abstract:
This is a general technical course. Its basic goal is that students acquire knowledge and skills to apply analysis and synthesis of technical and organisational solutions to labour safety. The tasks that are solved in the process of training are: Acquiring knowledge on methodology of analysis and synthesis of technical and production systems safety – sources, characteristics, effect, normalisation, measuring and assessment of regulated dangerous and harmful production factors; Acquiring knowledge on the methods of safe technical systems design; Design of technical devices and argumentation of organisational solutions on labour safety; Assessment of technical safety effectiveness; Labour safety control;
Course content:
Technical safety – basic terms and definitions; basic methods of safe technical system design; Mechanical safety of technical systems; Electrical safety; Electromagnetic safety; Emission and imission safety; Noise and vibration safety; Radiation safety; Ergonomic fundamentals of technical and production systems safety; Safety actions; Assessment of effectiveness of safety assurance of production equipment and processes; Control of labour safety.
Teaching and assessment:
The lectures are made clear with visual aids in conformity with the specific features of the major. Laboratory class assignments have experimental and research character. Students should be well prepared in advance. Students will sit for two tests. The final grade is based on the results from test papers, tests and participation in the laboratory classes.

3047 Reliability of Vehicles

ECTS credits: 6
Weekly workload: 2lec+0sem+1labs+1ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Automobiles, Tractors and Fork-lift Trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc.Prof. Rusi Getsov Rusev, MEng, PhD, Department of Automobiles, Tractors and Fork-lift Trucks, tel. 888 526, E-mail:rgr@ru.acad.bg;
Assoc. Prof. Rosen Ivanov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel: 082 888, E-mail: rossen@ru.acad.bg.
Abstract:
The Reliability of Vehicles course is aimed at delivering knowledge on a wide range of matters, connected with the analysis and synthesis of reliable systems in the field of different transport vehicles. The ways of securing reliability at the design, construction and operation stage are viewed. A definite stress in the teaching material is given to the probable evaluations of reliability.
Course content:
Basic concepts and semesters. Reliability of the products at. Reliability indicators. Static models of reliability. Probability methods in engineering design. Dependence of reliability on the distribution of strength and strain. Designing with evaluation of reliability. Reliability at the construction and operation stage. Evaluation of product reliability by the test and exploitation results. Loading and computing modes.
Teaching and assessment:
The main knowledge on the discipline is acquired by lectures, delivered in the classical way. The students are shown suitable slides, transparencies and video materials. The individual work of the students consists of accomplishing laboratory exercises, by which the studied knowledge is consolidated. Final assessment is based on the grade for overall student performance during the semester as well as participation in lectures and the quality of student work during laboratory classes.

3048 Railway Machinery

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+1ps
Assessment: exam
Type of exam: written
Department involved:
Department of Automobiles, Tractors and fork-lift trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Rosen Ivanov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel: 082 888, E-mail: rossen@ru.acad.bg.
Abstract:
The subject has the following goals: studying the fundamentals of railway machinery with the possibility of future individual prolongation of study; expanding transport machinery knowledge in general; assimilating knowledge of fundamental engineering subjects. Problems concerning main system construction and theory of locomotives and carriages are considered.
Course content:
Introduction into locomotive and carriages. Classification and performances. Cart. Main frame and body. Traction equipment of diesel locomotives. Traction equipment of electric locomotives. Traction performance of locomotives. Traction force limit by criteria cohesion between wheel pair axles and railway. Auxiliary machines, ensuring traction equipment work. Movement of locomotives and carriages in straight and curved railway sections. Traction of trains. Forces, acting to the train. Train movement equation.
Teaching and assessment:
On some topics laboratory work and practice are provided for active studying of the lecture material. Studying of real constructions of railway machinery is organised through field practice and implemented in railway enterprises like the Traction station of Ruse, the carriage-repair plant etc. The final exam is written.

3049 Testing of Internal Combustion Engines (ICEs)

ECTS Credits: 8 **Weekly workload:** 3lec+0sem+3labs+0ps+cw
Assessment: exam **Type of exam**: written
Department involved:
Deprtment of Internal Combustion Engines and Department of Automobiles, Tractors and Fork-Lift Trucks Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc.Prof. Atanas Ljubenov Iliev, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888-272,
E-mail: ailiev@ru.acad.bg.
Abstract:
The subject gives knowledge to the students about principles, methods and means of measurement at testing and research of ICEs, in conception with the improvement of their power, dynamic, toxic, acoustic and strength characteristics. The students obtain skills to choose testing equipment and to plan and realize engineering research.
Course content:
Measuring at testing and research of ICEs. Errors of measurement and theory for their eliminations. Measuring of torque and engine power. Measuring of angular speed, acceleration and time. Electrical methods for testing of engines. Methods of planned experiment. Theoretical formulations about modern research of ICEs' characteristics.
Teaching and assessment:
The lectures and the practical classes are organised on the basis of classical technology with employment of foliograms, computers and a laboratory test stand and equipment. Before the practical classes an entrance test for the students on their training for the regular topics is conducted. For each class a report is written. At the end of the semester a written test is given to check the knowledge on all lectures. If the grade on this test is good the student can be exempt from examination.

3050 Automobile and Tractor Testing

ECTS credits: 8 **Weekly workload:** 3lec+0sem+3labs+0ps+cw
Assessment: exam **Type of exam:** written
Department involved:
Department of Automobiles, Tractors and Fork-lift Trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Totju Totev, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks,tel.: 082/888 528, E-mail: totev@ru.acad.bg.
Abstract:
The course aims to acquaint the students with the main methods of automobile and tractor testing, and with the operation principles and construction of the major measuring apparatuses and devices. Profound knowledge in the field of mathematics, strength of materials, electrical engineering and electronics, automotive engineering parts I and II part is required. The course is a prerequisite for preparing diploma projects and future engineering practice.
Course content:
Measuring information systems. Primary transducers. Measuring schemes. Measuring and registering devices. Exactness of the measuring results. Sources of mistakes in measuring. Laboratory, road and range testing of AT. Preparation of AT for testing and organisation of testing.
Teaching and assessment:
Students get acquainted with the theoretic basis of the course studied through lectures, acquiring part of them practically by laboratory work. Students must be prepared for the laboratory classes and they write a report for each of them. The individual application of the acquired knowledge is consolidated by an individual course work, which is prepared personally by the student and is connected with defining certain measures of certain AT marks. Students sit in for an exam after delivering the course work and submitting the reports from the laboratory classes. Students can voluntarily take part in 2 written tests on the lecture material and can be exempted form the exam if the results are very good.

0820 Ecological Problems of the Transport

ECTS credits: 2
Weekly workload: 2lec+0sem+1labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Kiril Nikolaev Barzev, MEng, PhD, Department of Internal Combustion Engines, tel. 888 432,
E-mail: barzev@ice.ru.acad.bg.
Abstract:
The course gives knowledge about the basic interaction between internal combustion engines, energy sources, environment and the harmful consequences for the humans and nature. The course requires profound knowledge of ongoing processes in internal combustion engines as well as basic knowledge of chemistry and thermodynamics.
Course content:
Harmful engine emissions and their contribution to global environmental pollution. Physical-chemical processes in the formation of basic toxic engine exhaust emissions and influencing factors. Measurement and legislation of internal combustion engines toxic exhaust emissions. Ways for toxic components reduction in spark-ignition and compression-ignition engines.
Teaching and assessment:
During the laboratory classes the students assimilate the concepts about formation and measurement studied at lectures. Students are assessed continuously and the final mark is based on two tests administered during the semester.

3052 Technology and Organisation of Transport

ECTS credits: 5
Weekly workload: 4lec+0sem+4labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Pencheva, MEng, PhD, Department of Transport, tel: 888-825,
E-mail: Vpencheva@ecs.ru.acad.bg.
Abstract:
The course introduces the students to the concept of unified transportation system, its basic composite parts; the main characteristics of the freight and passenger flows; the process of transportation; organisation of the movement and technology and organisation of the transport, elements of the international transport market.
Course content:
Essence and management of unified transportation systems and unified transportation markets.
Operational characteristics and special features of the basic types of transport vehicles - truck, rail, ship and air. Characteristics and classification of the different types of cargo according to different types of transportation. Definitions, essence, modeling and analysis of the transportation processes within the different modes of transport. Routing and organisation of vehicle movement for freight and passenger transportation. Technology and organisation of the industrial and building goods transportation. Technology and organisation of agricultural goods transportation. Multimodal transportation of goods. International transport.
Teaching and assessment:
Lectures are delivered in a traditional format. The main topics delivered during lectures are assimilated through the provision of specific examples from practice. Presentations and video films are used. The attention of the audience is kept by discussions. The practical classes include: gathering information and solving specific cases from the subject. An Internet room is used.
Final assessment is based on the exam result and the overall performance of the student during the semester.

3053 Electronic Systems in Engines and Automotive Engineering

ECTS credits: 2 **Weekly workload:** 2lec+0sem+1labs+0ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Departments of Internal Combustion Engines and Automobiles, Tractors and Fork-lift Trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Valentin Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel.: 888 373
Assoc. Prof. Rosen Ivanov, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 888 524,
E-mail: rossen@ru.acad.bg
Abstract:
The subject goals are: introduction to the purpose, the operating principals and the structure, of main electronic systems in engines and automotive engineering. Typical examples of the systems are included. The course gives only initial knowledge which will be expanded in other courses.
Course content:
Mixture formation. Optimal mixture content. Different ways of mixture formation and combustion properties. Fuel injection. Electronic carburetors. Ignition government. Complex government of gasoline engine. Automobile and tractor automatic gear boxes. Electronic government of steering and suspension. ABS. Air bag. Electronic government of hitch system and the slip of the tractor.
Teaching and assessment:
Laboratory facilities and slides are used in the process of instruction. Laboratory classes finish with a report. The workshops include investigation of electronic systems. There are two assessment tests per semester connected with the lectures. They form the final grade.

3054 Fuel Systems and Automatic Control of Internal Combustion Engines

ECTS credits: 7 **Weekly workload:** 6lec+0sem+4labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Department of ICE
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mladen Bogdanov Mladenov, MEng, PhD, Dept. of ICE, tel: 888 374,
E-mail: mmladenov@ecs.ru.acad.bg
Abstract:
The course studies the design and processes in fuel systems of Internal Combustion Engines (ICE), as well as automatic governing of ICE. Students are required to have knowledge of Theory of ICE, Mathematical Analysis, Fluid Mechanics and Mechanics.The course is a prerequisite for the preparation of the diploma project and for engineering practice.
Course content:
The course consists of three parts. The first part is devoted to fuel systems of spark ignition engines. The second part is devoted to fuel systems of compression ignition engines. The third part is devoted to automatic governing of ICE. In the framework of the first two parts students study the system operating principles, system processes and design, calculation and methods. During the lectures of the third part students study the principles of governing of ICE, their calculation and design, as well as the quality of engine speed governing process.
Teaching and assessment:
Student's knowledge of the study material delivered at the lectures is tested during laboratory classes. After a laboratory class every student prepares a laboratory report, which must be satisfactorily defended. A course work has to be prepared during the semester and defended by the end of semester. Defended laboratory reports and defended course work are required preconditions for taking the course exam. Three topics are included in the examination procedure, one for each part of the course.

3055 Vehicle Control Systems

ECTS credits: 7 **Weekly workload:** 6lec+0sem+4labs+0ps
Assessment: exam **Type of exam:** written
Departments involved:
Department of Automobiles, Tractors and Fork-lift Trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Rosen Ivanov, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 082/888 528, E-mail: rossen@ru.acad.bg
Assoc. Prof. Rusi Rusev, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 082/888 524, E-mail: rgr@ru.acad.bg
Abstract:
The subject goals are: obtaining knowledge about: structure and working of the control systems used in the vehicles; technical devices included in vehicle control systems; some calculations concerning investigation and designing of vehicle control systems.
Course content:
Fundamentals of automatic control systems. Control of the internal combustion engines. Control of the automatic transmission. Systems for improving the braking performance and stability. Control of the steering system. Automatic control of suspension. Automatic control of the vehicle equipment.
Teaching and assessment:
Multimedia, slides, laboratory facilities and instruments and real parts from control systems are used during the instruction. Laboratory classes finish with a report. The workshops include investigation of technical devices for automation of automobiles and tractors. The students make measurements, obtain the experimental data and solve problems discussed in the lectures. There are 2 control tests on the teaching material during the semester. The final grade is formed by the written exam, including 1 problem and 1 question from the lecture material. It is necessary that each of those two grades is a pasing grade. The final grade is formed from the grades obtained from the exam and the control tests.

3056 Self-Preparation for the Final Project

ECTS credits: 4 **Weekly workload:** 0lec+0sem+0labs+10ps
Assessment: oral test **Type of exam:** oral
Department involved:
Department of Automobiles, Tractors and Fork-lift Trucks, Dept. of ICE
Faculty of Automotive and Transport Engineering
Lecturers:
Final project supervisor
Course content:
During the self-preparation the student works on his/her final project. The final project supervisor and consultant (if necessary) help the student. The student has to explore the problem, write a thesis including results from the exploration, calculations etc, and graphical part including drawings, graphics etc.
Teaching and assessment:
The final project supervisor and responsible Department define the problem which the student has to solve. During his/her work the student uses the recommendations of his supervisor and consultant, and periodically reports about his/her work. After the student finishes the work, the supervisor confirms with his signature that the final project is comprehensive and can be officially presented.

3057 Bachelor Thesis

ECTS credits: 10 **Weekly workload**:
Assessment: official defense **Type of exam**: oral
Department involved:
Department of Automobiles, Tractors and Fork-lift Trucks and Department of Internal Combustion Engines Faculty of Automotive and Transport Engineering
Consultants:
All lecturers from the Department of Automobiles, Tractors and Fork-lift Trucks Department of Internal Combustion Engines.
Abstract:
The Bachelor thesis is an independent creative assignment, which is fulfilled under the supervision of a research lecturer and if necessary, under the leadership of a research consultant. Its objective is to give the students the opportunity to show the accumulated knowledge and skills during their study for achieving the objectives and tasks of the Bachelor thesis and to present their creative development successfully in front of an exam board.
Course content:
The Bachelor thesis includes: calculations-based explanatory note and graphical part.
Teaching and assessment:
The specialists of Department of of Automobiles, Tractors and Fork-lift Trucks and Department of Internal Combustion Engines are responsible for collecting, confirming and announcing the topic suggestions for Bachelor thesis; the distribution of themes and research leaders to the students; the diploma practice organization; the leadership, review and presentation of the Bachelor thesis.
Weekly tutorials with the research leaders are planned for the students. Then the process of the fulfillment of the given assignment is monitored.
The final year student presents the Bachelor thesis in front of the State Examination Board.

UNDERGRADUATE STUDIES IN TRANSPORT MANAGEMENT AND TECHNOLOGY

PROFESSIONAL STANDARDS
OF A BACHELOR IN

TRANSPORT MANAGEMENT AND TECHNOLOGY

Degree programme: **Transport Management and Technology**
Educational Degree: **Bachelor**
Professional Qualification: **Transport Engineer**
Length of programme: **4 years (8 semesters)**

Field of Study: The **Transport Management and Technology** degree programme prepares highly qualified Bachelor of Engineering with Management professionals in full compliance with the EU requirements as listed in Directive 89/43D/EIO

Professional Qualifications: The Bachelor of Engineering with Management degree course is designed for students who seek comprehensive education in transportation and prepares professionals for scientific and practical work in the areas of systems theory, design and architecture, socio-technical enterprise systems and research methods, within a transportation framework.

Bachelor of Engineering graduates will complete the programme acquiring a high level of theoretical and practical understanding of economics, ecology, business law, organisational strategy, management and gradeeting. Foreign language knowledge and understanding of the cultural peculiarities of doing business in a global setting are another accent of the programme.

The academic programme is built around the following cornerstones:

- **Professional preparation** – builds upon the foundations of mathematics, physics, electrical engineering, IT, general engineering, and foreign languages.
- **Specialized preparation** - focuses on the intersection of studying transportation and manipulation quantitative methods, information technology, logistics, modelling and optimisation of transportation processes, business and tax law, transportation gradeetplaces, rolling stock maintenance, licensing, civil and environmental engineering applications designed to accommodate students with a strong interest in transportation.

The Bachelor of **Transport Management and Technology** graduates will be able to:

- Creatively apply their knowledge of transportation and continuously update it according to the emergence of new transportation technologies and practices.
- Systematically approach and implement up-to-date methods and means to reach optimal solutions to complex transportation problems.
- Design optimal transportation-network processes and systems.
- Utilize the capabilities of information, communication and management systems within a transportation framework.
- Manage mass transportation systems from a business and logistical standpoint
- Responsibly manage transportation safety and uphold ecological standards.

Professional realisation for graduates with MEng in **Transport Management and Technology** will transcend industries and organisations, and can be applied to any type of transportation business setting that requires comprehensive transportation optimisation and financial analysis, including, but not limited to the following: mass transport systems, logistical distribution centres, governmental transportation macro-management, and legislature-setting and law enforcement governmental bodies.

CURRICULUM

of the degree course in

TRANSPORT MANAGEMENT AND TECHNOLOGY

First year

Code	*First semester*	*ECTS*	*Code*	*Second semester*	*ECTS*
1024	Mathematics 1	5	0002	Informatics 2	4
1038	Information Technologies 1	4	0191	Structure of Engines and Transport Engineering	6
0009	Physics	5	0174	Mathematics 2	6
2799	Chemistry and Exploitation Materials	5	1670	Material Science	5
2800	Basics of Law 1	2	2802	Transportation Infrastructure	6
2801	Fundamentals of design 1	5			
	Foreign language:			***Foreign language:***	
0894	English 1	4	0761	English 2	3
0843	German 1		0763	German 2	
0950	French 1		0764	French 2	
0983	Russian 1		0842	Russian 2	
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Second year

Code	*Third semester*	*ECTS*	*Code*	*Fourth semester*	*ECTS*
3012	Mathematics 3	4	3018	Fundamentals of design 2	5
3013	Strength of Materials	5	3019	Transport Engines	8
3014	Electrical and Electronic Engineering	5	3020	Transport Machinery	8
3015	Mechanics	6	2811	Management Theory	5
3016	Metrology	4	3022	Economics	4
3017	Heating and Cooling Systems	6			
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Third year

Code	*Fifth semester*	*ECTS*	*Code*	*Sixth semester*	*ECTS*
3024	Technical Exploitation of Transport Vehicles 1	8	3030	Intermodal Forms of Transportation	6
3025	Communication and Security Engineering in Transport	5	3031	Transportation Planning and Forecasting	3
3026	Transportation Flows Theory and Logistics	4	3032	Information Systems and Technologies in Transport	5
3027	Financial Accounting and Finance	4	3033	Transport Management and Gradeeting	5
3028	Commercial Law 2	2	3034	Technical Exploitation of Transport Vechicles 2	6
3029	Materials Handling Machinery and Technologies	7	2253	Organisation and management of the servicing in transport	5
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Fourth year

Code	*Seventh semester*	*ECTS*
0379	Technical Safety	2
0398	Traffic Engineering and Control	4
0388	Traffic Safety	8
0409	Commercial Exploitation of Transportation	5
0444	Freight-forwarding Technologies and Organisation of Transport	6
0456	Passenger Transport	5
	Total Credits for the semester:	**30**

Code	*Eight semester*	*ECTS*
0603	International Transportation	4
	Group A	
0602	Transportation Modeling and Optimisation Methods	4
0714	Transport Ecology	4
0744	Business and Finance Management of a Transport Company	4
	Group B	
1445	Transport Systems Innovations	4
1460	Analysis and Reconstruction of Traffic Crashes	4
1461	Technologies in Vehicle Service	4
1506	Self-Preparation for the Final Project	4
1507	Bachelor thesis	10
	Total Credits for the semester:	**30**

Total for the degree programme: 240 ECTS credits

1024 Mathematics 1

ECTS credits: 5 **Weekly workload**: 3lec+0sem+0labs+2ps+ca
Assessment: exam **Type of exam:** written
Department involved:
Departament of Algebra and Geometry
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Petar Stoyanov, PhD, Dept. of Algebra and Geometry, tel: 888 453
Pr. Assist. Prof. Margarita Jakimova, PhD, Dept. of Algebra and Geometry, tel: 888 727
E-mail: mjak@ami.ru.acad.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:
Complex numbers and polynomials. Systems of linear equations and determinants. Matrix calculus. Line in plane. Lines and planes in space – forms of determining and common positions. Linear space and linear operators. Second order curves and surfaces. Functions and sequences. Limits and derivatives. Basic theorems of differential calculus. Applications of derivatives for investigating functions. Indefinite integral – definitions and basic properties; methods for calculation - integration by parts, integration by substitution, integration of rational, irrational and transcendental functions.
Teaching and assessment:
The theoretical basis of the topics presented at lectures is enhanced at seminars through solving problems; individual practising and reinforcing is accomplished by weekly assignments. Three written tests are administered and students with grades above 4.50 are exempt from an exam and their grade is formed on the basis of an interview with the lecturer. Students are given six problems at the exam and they have to solve at least three to pass. Each student is required a course assignment. Its successful presentation at seminars and regular class attendance are a necessary prerequisite to have a semester validated.

0002 Information Technologies 1

ECTS credits: 4 **Weekly workload:** 1lec+0sem+0labs+2ps+ca
Assessment: continuous assessment **Type of exam:** test
Department involved:
Departament of Informatics and Information Technologies
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Margarita Stefanova Teodosieva, MEng, PhD, Dept. of Informatics and Information Technologies, tel: 888 464, E-mail: mst@ami.ru.acad.bg
Pr. Assist. Prof. Stojan Donchev Chernev, MEng, PhD, Dept. of Informatics and Information Technologies, tel: 888 470, E-mail: stenly@ami.ru.acad.bg
Abstract:
The subject is aimed at introducing students to the computer and its components as a technical aid and to the most widely spread software products - operating systems, word processing systems, systems for processing information in spreadsheets, data bases, information systems, artificial intellect systems, computer graphics systems and data base management systems. The aim of the practical classes is to provide students with knowledge and hands-on experience on the use of the most widely spread application software – Windows, Word, and Excel.
Course content:
History and classification of computers. Hardware. Operating systems. Application software. Word processing systems. Spreadsheets. Databases: relation databases, data base management systems, data exchange and computer networks.
Teaching and assessment:
Lectures are carried out in blocks of two periods every other week. Practical classes are carried out in computer laboratories and represent practice under the guidance of a lecturer. At the beginning of the class ten minutes are allotted to testing the students' knowledge either through a short written test or through oral testing. Students' practical knowledge of the software product is monitored and assessed at the end of each part of the course. The course assignments require that the students demonstrate their ability to work individually with the software product being studied at the laboratory classes. They are assessed too. At the end of the semester students' theoretical competence is monitored by a test including 100 questions, covering the whole material studied on the course. The semester grade is formed on the basis of the results from the main test, the grade for the performance at the practical classes and the course assignments average grade.

0009 Physics

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Physics
Faculty of Electrical Engineering, Electronics and Automation
Lecturers:
Assoc.Prof. Todorka Stefanova, PhD, Dept. of Physics tel. 888 814, E-mail: dora@ru.acad.bg
Assoc.Prof. Nadezda Marinova Nancheva, PhD, Dept. of Physics, tel. 888 219,
E-mail: nancheva@ru.acad.bg
Pr. Assist. Prof. Parvoleta Ivanova Docheva, PhD, Dept. of Physics, tel. 888 219,
E-mail: docheva@ru.acad.bg
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.
Course content:
Measuring physical quantities. Kinematics and dynamics of material point and rigid body. Interaction in nature. Work and energy. Mechanical preservation laws. Special theory of relativity. Molecular physics and thermodynamics. Transformation phenomena. Periodic processes and waves. Electric field and electric current. Magnetic field and electro-magnetic induction. Optical phenomena. Atoms, atom nuclei. Elementary particles. Contemporary investigation theories and methods in physics and practical applications of the physical effects and phenomena are emphasized.
Teaching and assessment:
Lectures give the main theoretical material, supported by some demonstrations of physical phenomena and processes. 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. 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.

2799 Chemistry and Exploitation Materials

ECTS credits: 5
Weekly workload: 2lec+0sem+2labs+0ps+p
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Chemistry
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Petar Kopchev, PhD, Dept. of Repair, Reliability and Chemical Technologies, tel. 888 228,
E-mail: chimia@ru.acad.bg
Abstract:
The course helps students form basic notions about the structure of materials and substances, the properties of metals and alloys, corrosion, electrochemical phenomena and processes and their application in technology.
Course content:
Structure of substances; Metals and alloys; Corrosion and corrosion prevention; Electrochemistry; Polymers and Plastics; Lubricants
Teaching and assessment:
The material presented at the lectures is illustrated and clarified during the laboratory classes; the aim is to provide the students with a hand-on laboratory experience on the topics covered. The laboratory classes are divided into two modules. At the beginning of the laboratory class the students, divided into groups of four, are acquainted with the objectives of the exercise and the methodology of teaching and practising. The lecturer assists the students with their work and helps them summarize the achieved results. The students have to keep a diary about the tasks performed during lab classes; they are expected to enter the achieved and summarized results regularly and in accordance with the requirements. Assessment: students should sit for a written exam; they have to solve one stochiometric problem and answer two theoretical questions from the material covered at lectures.

2800 Basics of Law 1

ECTS credits: 3
Weekly workload: 2lec+1sem+0labs+0ps+p
Assessment: oral exam
Type of exam: oral
Department involved:
Departament of Civil Law
Faculty of Law
Lecturers:
Assoc. Prof. Ivan Ruschev., Dept. of Civil Law, tel: 888 721
Assist. Prof. Svetlana Raykova Marteva, Dept. of Civil Law, tel: 888 434
Assist. Prof. Denitza Lubomirova Kaneva, Dept. of Civil Law, tel: 888 434
Abstract:
The Basics of Law course aims at acquainting students with the matter, functions, methods and approach of the general theory of law, basic concepts of civil law as well as the same questions which arise in the main fields of law – property law, contractual law, family and heritage law, labour law.
Course content:
General concept of law. Juridical facts- concept and types. Juridical subjects. Concept, method, and system of civil law. Subjects of civil law. Legal transaction. Form, content and conclusion of the transactions. Delegation. Property rights – concept, types and defense. Construction rights. Right of use. Contractual law and contractual relations. Contract – concept, conclusion and types. Action /effect/ of the contractual relations. Different types of contractual relations – sale, donation, commission, rent, loan, etc. Marriage. Decent, kinship, adoption. Hereditary succession and testamentary succession. Labour relations – definition and general characterization.
Teaching and assessment:
The lecture topics enable students to get acquainted with basic regulatory acts in the field of civil law and its branches - property law, contractual law, family and heritage law, labour law; to interpret and analyse legal regulations; to compare at theoretical level the separate juridical figures and institutions.
Lectures and seminars are organized in parallel. For the latter students are expected to come to class prepared on topics assigned in advance. Discussions are held, main aspects are highlighted and the preparation is assessed during the seminars.
At the exam students answer two questions in writing, elaborating on them afterwards, answering additional questions from the syllabus, which the examiner may decide to ask, and the examiner assesses the degree to which the material has been acquired. When giving the grade, the examiner takes into account the student's performance at seminars.

2801 Fundamentals of Design 1

ECTS credits: 4
Workload per week: 1lec+0sem+0labs+3ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Engineering Graphics
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Petar Pantileev, MEng, PhD, Dept. of Engineering Graphics 888 491,
E-mail:pantileevp@ru.acad.bg
Annotation:
The subject examines the methods and means of presenting three- dimensional objects by plane images, the rules for preparing and making out drawings and technical text documents; norms and instructions of Bulgarian and international standards related to drawing up technical documents. It develops the steric imagination of students and their skills to cope with technical documentation. This subject is a prerequisite for studying other technical branches of science and doing course projects and graduation papers too.
Course syllabus:
Presentation of surfaces and objects. Presentation of technical items. Axonometric projection. Different connections – threaded, splinted and permanent connections. Drawing of a machinery piece – content, composition, images, measures, tolerance of dimensions, method of indicating surface texture, text information. Special documentation of some technical products. Drawings of precast units. Item list. Text documents.
Teaching and learning methods:
The theory, presented in lectures by didactic means, gives the knowledge needed for conducting practical classes and doing a course assignment. During the practical classes the students draw up plans, rough copies, axonometric images and technical text documents. In the course assignment the students are required to do some drawings with different images of steric objects and technical documents of a precast unit. Final assessment is based on the grades of two tests and that of the course assignment. Attestation is given, according to the academic regulations, provided that the course assignment is done and lectures and practical classes attended.

0894 English, 0843 German, 0950 French, 0983 Russian (Part I)

ECTS credits: 4
Weekly workload: 0lec+0sem+0labs+4ps
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Departament of Foreign Languages
Faculty of Law
Lecturers:
Sr. Assist. Prof. Sevda Tsvetanova, MA, Department of Foreign Languages, tel.: 888 816,
E-mail: stsvetanova@ru.acad.bg
Sr. Assist. Prof. Sergei Bartenev, MA, Department of Foreign Languages, tel.: 888 230,
E-mail: sbartenev@ru.acad.bg
Sr. Assist. Prof. Rumiana Milanova, MA, Department of Foreign Languages,
E-mail: rmilanova@ru.acad.bg
Sr. Assist. Prof. Iliana Benina, MA, Department of Foreign Languages, E-mail: ibenina@ru.acad.bg
Abstract:
The foreign language module 1 is aimed at achieving communicative competence in the area of the subject specialism 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:
Making a request. Offering advice. Conditionals. Describing a process. Components and specifications. Describing graphs. Higher education. Writing a CV. Likes and dislikes. Announcements and messages (formal and informal). Making suggestions and plans. The grammar material is connected with the lexical topics and situations.
Teaching and assessment:
In module 1 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.

0002 Informatics 2

ECTS credits: 4
Weekly workload: 2lec+0sem+0labs+1ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Informatics and Information Technologies
Faculty of Natural Science and Education
Lecturers:
Assoc. Prof. Margarita Stefanova Teodosieva, MEng, PhD, Dept. of Informatics and Information Technologies,
tel: 888 464, E-mail: mst@ami.ru.acad.bg
Pr. Assist. Prof. Stojan Donchev Chernev, MEng, PhD, Dept. of Informatics and Information Technologies,
tel: 888 470, E-mail: stenly@ami.ru.acad.bg
Abstract:
Students are introduced to one programming language. They work out elementary algorithms, which are aimed at the development of their logical thinking. The topics of lectures present main algorithm structures –branch, cyclic recurrence, and multiple choices. Various types of data are analyzed: scalar data, structured data, etc. The problems solved find their application in engineering practice. At practical classes programmes are input and executed.
Course content:
Algorithms: main notions. Branch algorithms. Cycle algorithms. One-dimension arrays of algorithms. Two dimension arrays of algorithms. Structure of a Pascal programme. Types of data in Pascal. Data input and output. Branch statement, Multiple choice statement. Cycle statements. Types of arrays, work with arrays. Procedures and functions. Strings. Records. Files. Text files.
Teaching and assessment:
Lectures are carried out in blocks of two periods per week. The classes are practical ones with duration of two periods every other week. At the beginning of the class the assistant professor first explains the issues which students haven't been able to understand. Then they solve problems on algorithm compiling and write programmes. At the end of the class a short test is carried out.
The final course grade is formed on the basis of the grades of two course assignments, the grades of the tests and the impressions from the students' performance at the practical classes.

0191 Structure of Engines and Transport Engineering

ECTS credits: 6
Weekly workload: 0lec+0sem+0labs+6ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Automobiles, Tractors and Fork- lifts
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Totyu Totev, MEng, PhD, Dept. of Automobiles, Tractors and Fork lifts, tel: 888 528,
E-mail: totev@ru.acad.bg
Pr. Assist. Prof. Kiril Iliev Hadjiev, MEng, PhD, Dept. of Automobiles, Tractors and Fork lifts tel: 888 433
Assist. Prof. Georgi Kadikyanov, MEng, Dept. of Automobiles, Tractors and Fork lifts, tel.888 526
Abstract:
The course familiarizes the students with the overall structure and operating principles of the main systems and aggregates for road, railway, water and air transport. The course focuses on automobiles. The students gain knowledge and skills for adjusting, repair, maintenance and operating of automobiles.
Course content:
General structure and operating principles of piston engines. Body parts. Crankshaft/connecting rod and gas distribution mechanisms. Cooling, lubricating, feeding, igniting, and starting systems.
Constructive characteristics of ship and locomotive diesel engines. Structure and function of aircraft gas turbine engines and systems thereto.
Transmissions. Automotive clutches. Gear boxes. Continuous transmissions. Cardan couplings. Drive axles. Distribution boxes. Frame, wheels and suspension of wheeled vehicles. Frame, suspension and steering of transport vehicles. Braking. Working equipment. Specialised transport vehicles. Diesel locomotives. Electrical locomotives. Carriages. Railway facilities. Boat structure. Boat power supply. Boat equipment. Airplane structure.
Teaching and assessment:
Training is conducted in subgroups. Teaching aids include slides, posters and videocassettes. Practical skills are acquired by working on models and real transport vehicles. The course includes visits to transport companies, river port and Ruse airport. Each section of the course is assessed separately. Final assessment is an aggregate of these grades.

0174 Mathematics 2

ECT S credits: 6
Weekly workload: 3lec+0sem+0labs+2ps+ p
Assessment: exam
Type of exam: written
Department involved:
Departament of Mathematical Analysis
Faculty of Natural Sciences and Education
Lecturers:
Prof. Stepan Agop Tersian, PhD Maths, Dept. of Mathematical Analysis, tel. 888 226, 888 587.
Pr. Assist. Prof. Julia Chapareva, Dept. of Mathematical Analysis, tel. 888 226, 888 587
Assoc. Prof Antoaneta Mihova, Dept. of Mathematical Analysis, tel. 888 226, 888 727
Abstract:
The subject acquaints students with basic notions of mathematical analysis, necessary for further study of Mathematics Part III, Applied Mathematics, theoretical basis of Electrical Engineering, Mechanics, etc.
Course content:
Basic topics: Functions of more than one variable; Differential geometry in plane and space; Ordinary differential equations; Multiple integrals; Field theory; Numerical and functional series.
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. Three written tests are administered during the semester. Final assessment is based on a written exam consisting of problems to be solved and theoretical questions to be answered. During the semester consultations are held - two classes per week. The requirement to have a semester validated is regular seminar attendance.

1670 Material Science

ECTS credits: 5
Workload per week: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Materials & Manufacturing Engineering (M&ME)
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Prof. Rusko Ivanov Shishkov, MEng, PhD, Dept. of M&ME, tel. 888 204, E-mail: rish@ru.acad.bg..
Abstract:
The discipline gives fundamental concepts of the relationships among the composition, structure and properties of materials most widely used in the practice and also concepts of the changes in those materials caused by heat and chemical-heat treatment and their service use. The knowledge acquired offers a possibility for correct selection of materials and methods for their treatment so that optimal operating properties are ensured.
Course content:
Crystal structure. Equilibrium diagrams. General concepts of non-equilibrium phase transformations. Crystallisation of pure metals and alloys. Steels – multi component iron-based alloys. Base structures and base transformations in the steels. Classification and gradeing of steels depending on their use. Classification of the methods for heat treatment. Graphitisation of white irons. Other metals and their alloys. Rock materials, glasses and ceramics. Polymers, glues, paints and varnishes. Metal- and non-metal-based composites.
Teaching and assessment:
The theoretical knowledge given in the lectures is assimilated, specified and enlarged through the laboratory exercises. The exercises are devoted mainly to the structure of the materials as well as to the thermal methods for structure changes. During the semester three tests are administered. The results of the tests are taken into account when forming the final grade from the examination.

2802 Transportation Infrastructure

ECTS credits: 6
Weekly workload: 2lec+0sem+0labs+2ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikolai Iliev Kolev, MEng, PhD, Department of Transport, tel.888 231
E-mail: Nkolev@manuf.ru.acad.bg
Pr. Assist. Prof. Aleksandar Iordanov Stoianov, MEng, PhD, Department Transport, tel.888 231
E-mail: AStoianov@ecs.ru.acad.bg
Abstract:
By studying this course students have the opportunity to obtain basic knowledge about the main components of the transport infrastructure and the different kinds of transport. Emphasis is put on the structure, the functions, the technical and the operation parameters of railway, passenger and cargo stations, wharfs, airports, pipeline transport and the stores of transport terminals.
Course content:
Unified transport system. Roads, road equipment and accessories. Railways, stations and depots. Water-ways and ports. Airfields and airports. Transport terminals/kinds, technological processes and project solutions, passage responsibility. Pipeline transport. Properties. Basic parameters.
Teaching and assessment:
The lectures are conducted in the traditional way. Visual aids are used and discussion is a key technique. The practical classes include visits to the railway station, wharf complex, airfield, etc., as well as work at the laboratories. Standard projects are examined and main parameters are analyzed at the laboratories. The course project is developed according to schedule. The final grade is formed from the exam /spoken and written/ grades and the grades from the practical classes and the course project.

0761 English 0763 German; 0764 Frensh; 0842 Russian (Part II)

ECTS credits: 3
Weekly workload: 0lec+0sem+0labs+3ps
Assessment: oral exam
Type of exam: oral
Department involved:
Departament of Foreign Languages
Faculty of Law
Lecturers:
Sr. Assist. Prof. Mariela Georgieva Risova, MA, Department of Foreign Languages, tel.: 888 816,
E-mail: mrisova@ru.acad.bg
Sr. Assist. Prof. Sergei Bartenev, MA, Department of Foreign Languages, tel.: 888 230,
E-mail: sbartenev@ru.acad.bg
Sr. Assist. Prof. Rumiana Milanova, MA, Department of Foreign Languages,
E-mail: rmilanova@ru.acad.bg
Sr. Assist. Prof. Iliana Benina, MA, Department of Foreign Languages, E-mail: ibenina@ru.acad.bg
Abstract:
The foreign language module 2 like module 1 is aimed at achieving communicative competence in the area of the subject specialism 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:
Making a request. Offering advice. Conditionals. Describing a process. Components and specifications. Describing graphs. Higher education. Writing a CV. Likes and dislikes. Announcements and messages (formal and informal). Making suggestions and plans. The grammar material is connected with the lexical topics and situations.
Teaching and assessment:
As in module 1 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 modern trends in foreign language teaching.

3012 Mathematics 3

ECTS credits: 4
Weekly workload: 2lec+1sem+0labs+1ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Numeric Methods and Statistics
Faculty of Natural Sciences and Education
Lecturers:
Assoc. Prof. Ljuben Georgiev Valkov, PhD, Dept. of Numeric Methods and Statistics, tel: 888 466,
E -mail: vulkov@ru.acad.bg
Pr. Assist. Prof. Violetka Atanassova Kostova, Dept. of Numeric Methods and Statistics, tel:888 466,
E -mail: vkostova@ru.acad.bg
Abstract:
The Mathematics Part III course is aimed at providing students with skills for processing data, obtained from experiments in the field of engineering, which require the use of:
- Relativity theory mathematical apparatus;
- Mathematical statistics methods for experimental data processing;
- Specialised software like Matlab and some methods for planning an experiment

Course content:
The course includes elements from the theory of relativity, mathematical statistics, regression and correlation analysis, linear algebra numerical methods and mathematical analysis.
Teaching and assessment:
The training process is organized in lectures, seminars and practical classes. At lectures theoretical issues are presented and illustrated with appropriate exemplary problems, connected with the students' degree course. At seminars students solve problems, connected with engineering practice and requiring the application of the theory of relativity mathematical apparatus, as well as mathematical statistics. Each student is required to do an individual course assignment.
The final course grade is formed on the basis of the following formula:
Final course grade = 2/3 the grade of the test + 1/3 the grade of the course assignment.

3013 Strength of Materials

ECTS credits: 5
Week workload: 2lec+2sem+0labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Engineering Mechanics
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Ivelin Ivanov, MEng, PhD, Department of Engineering mechanics, tel. 888 224,
e-mail: ivivanov@ru.acad.bg.
Pr. Assist. Prof. Nikolai Georgiev, MEng, Department of Engineering mechanics, tel. 888 478,
e-mail: ngeorgiev@ru.acad.bg.
Abstract:
Strength of materials is a general engineering subject, playing an important role for students of engineering. The aim of the course is to help the future engineers gain basic knowledge and ability to model and calculate the strength of simple structures and structure elements under simple and combined loadings. Previous knowledge in Mathematics, Mechanics, and Physics is necessary. The knowledge gained is a prerequisite for the subjects of design, technology, and maintenance, as well as for direct application in engineering practice.
Course content:
Basic terms and assumptions. Real subject and its theoretical model. Tension, compression. Statically indeterminate problems in tension and compression. Tension and compression tests of materials. Shear. Torsion of circular bars. Bending. Deflection in bending. Transverse shear bending and 3D bending. Non-axial tension and compression. Buckling of struts. 3D stress and strain. Failure criteria.
Teaching and assessment:
The theoretical basis presented in the lectures is used in the practical classes to solve problems. The exam consists of test questions and problems for solving. The students can use formulae written by them at the exam. An active and regular participation in the learning process as well as course work submission and defense is required for semester passing approval.

3013 Electrical And Electronic Engineering

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps+p
Assessment: exam
Type of exam: oral
Department involved:
Departament of Theoretic Electrical Engineering and Electrical Measuring
Faculty of Electrical and Electronic Engineering, and Automation
Lecturers:
Assoc. Prof. Georgy Rashkov Georgiev, MEng, PhD, Dept. of Theoretic Electrical Engineering and Electrical Measuring, tel. 888 412
Abstract:
The subject of Electrical and Electronic Engineering is part of the curriculum for the bachelor degree of non-electrical degree-courses. The aim of the course is to introduce students to main theoretical issues in Main Laws of the Theoretical Electrical Engineering, Electrical Measurement, Electrical and Non-electrical Quantities, DC and AC Electrical Machines, Electronic semiconductors and circuits. Previous knowledge in Physics and Mathematics is necessary. The knowledge of Electrical and Electronic Engineering is a prerequisite for next semester courses and for preparing graduation work.
Course content:
Basic elements and magnitudes of electrical circuits: DC and AC, three-phase and magnetic circuits, electrical measurements of electrical and non-electrical quantities, DC machines, transformers, synchronous and induction AC machines. Main electronic devices: diodes, thyristors, transistors and operational amplifiers. Amplifiers. Digital networks.
Teaching and assessment:
The teaching process is organized in lectures and laboratory classes. Laboratory classes equip the students with practical knowledge. Each class starts with a15-minute testing on basic topics, which could be either written or oral. The purpose of the testing is to help the exam performance.

3015 Mechanics

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Department of Engineering Mechanics
Faculty of Mechanization and Manufacturing Engineering
Lecturers:
Assoc. prof. Georgi Gabrovski, MEng, PhD, tel. 888474, E-mail: ggabrovski@ru.acad.bg
Abstract:
Mechanics is a general engineering subject, which consists of theoretical and applied parts. The course contains basic topics for mechanical engineers included in the bachelor degree courses of Mechanics 1 and Mechanics 2. The aim of the course is the student to learn fundamental laws and methods, in order to analyze, assess and predict the events in mechanical systems and to acquire skills in the general engineering practice. The course is fundamental for the following course of design and control of particular transportation units.
Course content:
Kinematic and Dynamic characteristics of mechanical objects: particle, body, and multi-body systems. Different forces and moments. Supports and reactions of the supports. Inertia characteristics of bodies. Work, power and energy. Static and kinematic friction. The law of conservation of energy. D'Alembert's principle. Kinetostatics. Mechanical vibrations.
Teaching and assessment:
The teaching process is divided in lectures and practical classes. The theoretical material is presented in the lectures, visualized by slides. The basic relations with some examples are considered in the lectures. There is an oral test on the basic topics in the beginning of each practical class. Models of mechanical system elements are considered and applied problems are solved. Laboratory work on the vibrations is carried out in the practical classes. Course work is assigned to the students. Semester passing approval is given for regular attendance of classes and course work submission. The exam is written including 3 questions and 3 problems for 2 hours.

3016 Metrology

ECTS credits: 4
Weekly workload: 2lec+0sem+1labs+0ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Machine Tools and Manufacturing
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc.Prof. Tsvyatko Korijkov, MEng, PhD, Department of Machine Tools and Manufacturing, tel: 888 493, E-mail: korijkov@ru.acad.bg;
Assoc.Prof. Boris Sakakushev, MEng, PhD, Department of Machine Tools and Manufacturing, tel: 888 493, E-mail: bsak@ru.acad.bg;
Assoc.Prof. Branko Sotirov, MEng, PhD, Department of Machine Tools and Manufacturing, tel: 888 493, E-mail: bsotirov@ru.acad.bg.
Abstract:
The course gives fundamental engineering knowledge to the students in Transport Management and Technology. It enhances their specific knowledge and practical skills in areas such as Theoretical and Legislative Metrology, Methods and Equipment for Measuring of Machine Parts, and Quality Control of Measurement.
Course content:
Theoretical Bases of Metrology. Legislative Bases of Metrology. Basic Metrological Properties of Measurement Devices. Selection of Measurement Devices. Primary Transformers Used in Measurement Devices. Measurement of Length. Design of Geometrical Tolerances for Machine Parts. Methods and Measurement Devices for Cylindrical, Conical, Thread, Key and Groove Surfaces. Control of Gears. Measurement of the Quality of a Process.
Teaching and assessment:
Lectures: Case-based and including the basic principles for tolerance design for machine parts. *Laboratory classes:* Each laboratory class starts with a test and includes the preparation of a report. *Course assignment:* Using a specific design drawing each student designs the fittings in the drawing, specifies the geometrical tolerances and notes them on a chosen design drawing of a machine part choosing a measurement method and device. The course assignment includes explanatory notes and drawings. *Continuous assessment:* formed as the average of the first and second tests, and the course assignment grade.

3017 Heating and Cooling Systems

ECTS credits: 6 **Weekly workload:** 3lec+0sem+2labs+0ps+ca
Assessment: exam **Type of exam**: written
Department involved:
Department of Heat Engineering, Hydraulic and Pneumatic Equipment
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof. Valentin Vassilev Bobilov, MEng, PhD, Dept. of Heat Engineering, Hydraulic and Pneumatic Equipment, tel: 888 844, E-mail bobilov@ru.acad.bg.
Abstract:
The theoretical part of the course contains a systematic presentation of the main laws of heat engineering. The course deals with the physical fundamentals and relationships in heat transfer through heat conduction, heat exchange and heat radiation. The presentation assists the students in calculating and sizing of heating equipment. The course studies the cycles of piston and gas engines and steam boxes. It also deals with the various types of cooling aggregates and their main cycles, as well as with transport refrigerators. The new trends in cooling systems are discussed too.
Course content:
Basic notions. First law of thermodynamics. Specific heat capacity of substances and gases. Calorimetric equation. Analytic expressions of the first law of thermodynamics. Main thermodynamic processes of ideal gases. Convection processes. Cycles of working machines and heat motors Thermal efficiency quotient. Karno's cycling process. Second law of thermodynamics. Entropic diagrams. Serviceability of thermodynamic systems. Water steam processes. Heat conduction – Furie's equation. Heat convection. Radiant heat exchange. Complex heat exchange and heat transfer. Heat exchanging appliances. Cycles of working machines and heat. Fundamentals of refrigeration. Cooling agents. Refrigerating agents. Cycles of refrigerating systems. Transport refrigerating systems. Thermal pumps and thermal heating.
Teaching and assessment:
Students acquire theoretical knowledge from lectures and practical skills from the laboratory classes. Final assessment is an aggregate grade based on course work defense, student performance and exam results.

3018 Fundamentals of Design 2

ECTS credits: 5 **Weekly workload**: 2lec+0sem+2labs+0ps+cw
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Emilia Angelova, MEng, PhD, Dept. Machine Science and Machine Elements,
tel. 825 663, 888 461; E-mail: ang@ru.acad.bg.
Annotation:
The course is a natural continuation and consolidation of the knowledge and skills gained in the subject Design basics – Part 1. Methods and approaches to design are presented in methodological succession. General machine elements are studied in a complex manner – theories, calculations and design. Input links: knowledge of Design basics 1, Material science, Mechanics, Material resistance, Metrology. Output links: basic knowledge and skills in general design, necessary for the practical realization of the engineer, for course work and projects in the specialized courses and for diploma project design.
Course content:
Design principles. Manufacturing machines design. Standardization and unification. Basic design rules. General design rules. Strength of structures and of machine elements. Bulk strength. Stress concentrators. Variable stresses. Surface strength. Connections: threading, rivets, welding, press, cotters and grooves. Elements of rotary motion: straight axes and shafts, bearings, couplings. Mechanical drives: cylindrical and bevel involute gears, worm gears, belts, and chain drives.
Teaching and assessment:
The lectures are carried out in a lecture hall, equipped with special posters and a projector. The laboratory classes are carried out on special test sets, as the gathered data are processed with the help of a PC. The reports are completed during the exercise. The necessary control is carried out through individual computer tests. Each student develops two course work tasks by him/herself. They are controlled and assessed on a regular basis and following the syllabus. Their assessment is done after the presentation of the required graphical part and the project papers during public defense. The final grade is formed based on the results from the regular test on the lectures (tests), personal skills, shown during the development of the course projects (grades) and the activity during laboratory classes.

3019 Transport Engines

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Departament of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Tsonyu Ivanov Petkov, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 335.
Abstract:
This course teaches the theory, dynamics, testing, and characteristics of internal combustion engines. It is based on extensive knowledge of thermodynamics, theoretical mechanics, strength of materials, machine elements, fluid mechanics, and exploitation materials.
It is the basis for studying other courses (Transport equipment maintenance, Technical exploitation of transport)
Course content:
Internal combustion engines (ICE) classification. Actual ICE cycles. Processes in ICE. Indicator and effectiveness parameters. Surcharging. Ecological parameters. Operating modes and characteristics. Mixture formation and fuel units in diesel and benzene engines. Regulators. Crankshaft/connecting rod mechanism. Gas distribution, lubricating, and igniting systems. Other types of heat engines.
Teaching and assessment:
Slides are used for illustration purposes during lectures. Each lecture includes a test on the material from the previous lecture. Duration of seminars: 3 hours. The seminars deal with the fuel units of carburetor and diesel engines, as well as engine characteristics. Fuel supercharging pumps and regulators are tested and adjusted. During one of the seminars, students get acquainted with the electrical system elements of ICE. For each seminar, there is an entry-level test, every student elaborates and defends a project about heat, kinematic, and dynamic engine calculation. At the end of the semester, an overall test is given on material from the lectures. Each student's grade is based on the results of the above-mentioned test, the tests during the semester, and the project. In case of positive aggregate grade from all components, students can be exempted from examination.

3020 Transport Machinery

ECTS credits: 8
Weekly workload: 4lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written
Department involved:
Departament of Automobiles, Tractors and Fork Lift Trucks
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Borislav Georgiev Angelov, MEng, PhD, Department of Automobiles, Tractors and Fork Lift Trucks, tel. 888457, E-mail: bangelov@ru.acad.bg
Assoc. Prof. Ivan Iliev Evtimov, MEng, PhD, Department of Automobiles, Tractors and Fork Lift Trucks,
tel. 888 527, E-mail: ievtimov@ru.acad.bg
Abstract:
The aim of the discipline is to acquaint the students with the basic operational characteristics of the transport vehicles, with the indexes of evaluation of these characteristics and the methods of their desemesterination. The course focuses on general purpose transport vehicles and specialized automobiles and road trains. Basic operational characteristics of railway, water and air transport vehicles are adequately explained and the teaching is practice-oriented.
Course content:
Transmission of the duty and the rotating moment of the motor towards the driving wheels, dynamics of the automobile, dynamic characteristics of the automobile, fuel economy, breaking characteristics, stability, running and roadability of the automobile, operational characteristics of railway, water and air transport vehicles.
Teaching and assessment:
The subject is taught through lectures and laboratory exercises. Students work out individually on course assignments. Lecture material makes use of up-to-date didactic means and audio-visual aids are based on modern constructions. Laboratory classes take place in a specialized laboratory hall at the department of ATF. In the course work the student uses the knowledge acquired for analysis of the construction and study of the dynamic characteristics of refueled automobiles. The discipline ends up with a written exam. Evaluation takes into account the results of the defense of the course assignment and the submission of the laboratory work reports.

2811 Management Theory

ECTS credits: 5
Weekly workload: 2lec+0sem+2labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Business and Management
Faculty of Business and Management
Lecturers:
Assoc. Prof. Alexander Petkov Petkov, PhD, Dept. of Business and Management, tel: 888 776;
E-mail: apetkov@ecs.ru.acad.bg.
Abstract:
The module of Management Theory is used to present main issues, methods and approaches for effective organisation and management of the processes and systems in transport. Students learn about the basics of management as a science, concepts and theory, main management functions and achievements of the management science.
Course content:
Development of the theory of management – approaches and directions. Management as a process and management functions. Decision making process. Organisations and structures in transport. Planning process in the organisation. Motivation and management. Labour management. Controlling in the company.
Teaching and assessment:
Teaching is through lectures and seminars. Lectures present the basic theory of management and different cases from the practice. During the seminars students fulfill various tasks and work on case studies from best management practices, and analyze and compare the manager's behavior with the theory. The final grade is based on continuous assessment during the semester of student performance at the seminars and two written tests – one in the middle of the semester and another at the end of it. Semester validation is required according to the Internal Rules for Education of Ruse University.

3022 Economics

ECTS credits: 4
Weekly workload:2lec+2sem+0labs+0ps+p
Assessment: exam
Type of exam: written
Department involved:
Departament of Economics
Faculty of Business and Management
Lecturers:
Assoc. Prof. Dianko Hristov Minchev, MEcon, PhD, Department of Economics, tel: 888 557,
E-mail: DMinchev@ecs.ru.acad.bg.
Abstract:
The Economics course considers the fundamentals and problems of the modern gradeet economy. In this way it creates a basis for all the other economic courses, as well as a common economic culture, which is expressed in forming an alternative way of economic thinking and capabilities for making an independent choice in the gradeet environment. These characteristics make it a necessary stage in every economic preparation of an academic character. The knowledge of mathematics is a prerequisite for Economics that in turn is a prerequisite for some specialist economic courses.
Course content:
Introduction – fundamentals of the economic theory. Main problems for every economy. Gradeet mechanism. Public sector and tax system. Supply and demand on the individual gradeets. Consumer behavior. Production, expenses and income of a firm. Imperfect competition and offering. Price-forming of manufacturing factors. Gross domestic product (GDP) and economic growth. Economic cycle, unemployment and inflation. Macroeconomic equilibrium. Fiscal policy. Budget policy. Macroeconomic policy in open economy.
Teaching and assessment:
The teaching is organised on the basis of lectures and seminars, which further deepen some of the questions discussed at the lectures. The participation of students in the seminars is accomplished by oral reports and essays, prepared by the students as their own choice or assigned as tasks by the lecturer.
Assessment is continuous. Its components are two tests and student participation in classes. At the end of the semester the final grade is formed as an average of the three.

3024 Technical Exploitation of Transport Vehicles 1

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikolai Iliev Kolev, MEng, PhD, Department of Transport, tel. 888 231,
E-mail: NKolev@ ecs.ru.acad.bg.
Pr. Assist. Prof. Aleksandyr Stoianov, MEng, PhD, Department of Transport, tel. 888 231,
E-mail: AStoianov@ecs.ru.acad.bg.
Abstract:
The course gives basic knowledge about the reliability of transport vehicles and the alteration of their technical condition in the process of exploitation, the factors which influence the intensity of the alteration of their technical condition and methods for its reduction, methods and means for diagnostics and managing the processes of technical maintenance of transport vehicles.
The laboratory classes aim at teaching the students to summarize, analyse and understand the results of the conducted experiments and exercises. The idea of the Course Project is to teach the students to evaluate the exploitation reliability of specific systems, to make a structural analysis, to choose appropriate diagnostical parameters and to make algorithms for diagnosis.
Course content:
Transport as a complex system and the role of technical exploitation into it. Reliability of machines in the process of exploitation. Alteration of the technical condition of transport vehicles, factors influencing the intensity and methods for its reduction. Laws of alteration of technical condition. Bases of technical diagnostics. Methods and means for diagnostics of transport vehicles. Managing the processes of technical maintenance of transport machines.
Teaching and assessment:
Lectures are based on the classical approach. Laboratory classes cover the material previously studied in class and involve all students, who, separated into subgroups, work individually over technical models, real samples, and stands that are used for practice. At the beginning of every new topic of laboratory classes, the students sit for a test, the purpose of which is to to evaluate their preparation for the exercise. The Course Project is submitted according to the established schedule and is evaluated through a special points system. The students are allowed to attend the Final Exam only if they have submitted their Course Project beforehand. The final grade is a sum of the final exam performance, of the quality of the Course Project and participation during the classes.

3025 Communications and Security Engineering in Transport

ECTS credits: 5
Weekly workload: 2lec+0sem+2labs+0ps+ca
Assessment: exam
Type of exam: oral and written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Abstract:
The course gives basic knowledge about communication and security systems in transport. It includes data about wire and wireless communications, their principles of work, their technical data and applications in practice, transport in particular.
Course contents:
Basic information about communication systems - transfer of information and the importance of communications for transport. Announcements, signals, communication channels, transmission environments and systems. Analogue and digital systems. Data transmission. Communication networks. Cellular networks – pager, cellular telephone. Satellite communications in transport. Information systems in transport. Systems for transmission of information in transport control systems. Systems for transmission of radio messages and radiodata for the traffic. Systems for ensuring traffic safety.
Teaching and assessment:
Lectures are conducted in a traditional form. Some key problems are discussed in the subject area studied. The laboratory classes help to assimilate the lecture material by means of real working devices, laboratory equipment, demo computer simulation packages and visual aids.
The final grade is awarded on the basis of a written case study exam and oral exam.

3026 Transportation Flows Theory and Logistics

ECTS credits: 4
Weekly workload: 3lec+0sem+1labs+0ps+ca
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, MMarinov@manuf.ru.acad.bg.
Abstract:
The course is designed to provide students with basic theoretical knowledge in the emergence, formation, characteristics and various methods to examine and manage the different types of transportation flows (auto, freight, passenger, etc.). The course provides detailed knowledge of logistics as a technique to manage the material flows, up-close examination of elements in a logistical chain and illustration of the methodology for the design of transportation and logistical chains through actual examples.
Course content:
Transportation flows – definition and characteristics. Theory of the automotive transportation flows – automotive integration, dynamics, high- and low-density flows. Concepts and methodological fundamentals of logistics. Logistics systems and functions. Supply chain, manufacturing and transportation logistics. Distribution and material flows logistics. Resource management in the logistic system.
Teaching and assessment:
Traditional lecture and discussion format with wide utilization of multi-media technologies to facilitate the learning process are offered. Lab classes focus on solving problems in real and simulated environments. The final grade is awarded on the basis of in-class written tests throughout the semester and overall class participation.

3027 Financial Accounting and Finance

ECTS credits: 4
Weekly workload: 2lec+0sem+0labs+1ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Business and Management
Faculty of Business and Management
Lecturers:
Assoc. Prof. Georgi Batashki, PhD, Dept. of Business and Management, tel. 888 357;
Pr. Assist.Prof. Ivanka Borisova Dimitrova, Dep. Economics, tel. 888 715, E-mail: idimitrova@ru.acad.bg
Abstract:
The course aims at providing students of Transport Technology and Management with basic skills and knowledge on financial accounting and finance. Students learn the forms and sources of finance and methods of allocation of financial resources and use accounting reports for analysing the success of the business and for managerial purposes.
Course content:
The course covers two groups of topics – Finance and Financial accounting. The Finance part reviews the essence and characteristics of corporate finance; time value of money; evaluating financial assets; types of capital; financing cost; capital structure and financial leverage; investment in fixed and current assets; classifications of costs and revenues and income determination. The Financial Accounting part comprises accounting for equity, fixed assets, inventory, monetary assets, costs, revenues, payables, receivables and financial statement analysis.
Teaching and assessment:
The course is based on a series of two-hour lectures, with associated seminars. The seminars are designed to provide hands-on experience in developing loan amortization and depreciation schedules, recording current operations and conducting ratio analyses. Each student works on an individual assignment that includes a financial task and an accounting task. Assessment: The final grade is based on a formal written exam and a course assignment in a proportion 70:30.

3028 Commercial Law 2

ECTS credits: 2
Weekly workload: 2lec+0sem+0labs+0ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Civil Law
Faculty of Law
Lecturers:
Prof. Luchezar Ivanov Dachev, PhD, Department of Civil Law, tel: 888 721
Sr. Assist. Prof. Ivo Hristov Guchkov, Department of Civil Law, tel: 888 721
Abstract:
The lecture topics enable students to learn about basic regulatory acts in the field of commercial and co-operative law; theoretically to make comparisons and analogies between the different juridical figures and institutions; to find out the specificities of commercial law, to acquire knowledge on the main aspects of commercial law.
Course content:
The Commercial Law course aims to acquaint students with the nature and method of legal regulation, with the system and sources of commercial law, with the questions of trade quality, business enterprise, business delegation, general principles of trade companies and co-operative societies, trade transactions, liquidation proceedings, insolvency, bankruptcy.
Teaching and assessment:
The series of lectures on Commercial Law presupposes knowledge in the field of general theory of law, property law, contractual law, etc., i.e. a successfully taken course in the subject Basics of Law.
Lectures and seminars are organized in parallel. For the latter students are expected to come to class prepared on topics assigned in advance. Discussions are held, main aspects are highlighted, regulatory acts are considered and student preparation is assessed.
The exam consists of answering two questions in a written form twice during the semester. The first time students should be prepared on the so called “general section” of commercial law and the second one is aimed at the lectures on trade companies, co-operative societies, trade transactions, bankruptcy. The grade is formed as a total result from the two written answers. In giving the grade, the examiner takes into account the student's performance at seminars.

3029 Materials Handling Machinery and Technologies

ECTS credits: 7
Weekly workload: 3lec+0sem+2labs+0ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Theory of Mechanisms and Machines and Materials Handling Engineering
Faculty of Agricultural and Industrial Engineering
Lecturers:
Assoc. Prof Georgi Getsov Kenarov, Meng, PhD, Department of the Theory of Mechanisms and Machines and Materials Handling Engineering, tel: 888 239, 888 664, E-mail: gkenarov@ru.acad.bg
Abstract:
The course familiarizes the students of Transport Engineering and Management with the construction, technical specifications, comparative analysis and selection of materials handling machinery needed for mechanizing the loading and unloading processes and with the fundamentals of design of transport handling technologies for various types of loads. The course utilizes the knowledge gained from the general purpose technical subjects.
Course content:
Main concepts and elements of materials handling. Transport terminals. Goods – transport and warehousing characteristics. Pallets and containers. Loading devices. Loading cranes and platforms, forklift trucks and other loading machinery. Auxiliary devices. Systems for processing of single, loose, packed, palletized and container goods. Fundamentals of design and principles for the construction of materials handling and warehousing systems.
Teaching and assessment:
The lecture material familiarizes the students with the main topics of the course. The laboratory classes acquaint them with the structure, operation and parameters of models and systems of materials handling machinery. Some of the practical sessions are conducted at cargo terminals. On analyzing the results the students prepare a report. The coursework includes the design of a technology and a loading device for a typical load. The exam starts with two questions followed by an interview. Final assessment is based on the course work grade too.

3030 Intermodal Forms of Transportation

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+0ps+ca
Assessment: exam
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, Vpencheva@ecs.ru.acad.bg.
Abstract:
The course introduces the students to the concept of a unified transportation system (country, region, and continent), its basic operational principles and different types of transportation and insemesterodal operations.
Course content:
Essence and management of the unified transportation system, unified transportation gradeet. Characteristics of the 4 basic types of transportation- truck, rail, ship and air. Characteristics and classification of the different types of cargo according to different types of transportation. Modeling and optimisation of the transportation processes. Routing for freight and passengers. Integration and intermodal transportation operations, organisation of the transportation corridors.
Teaching and assessment:
Lecture topics are applied to practical cases adopted from existing business practices. The sequence of the cases represents the actual stages of a business plan – developing understanding of the transportation flow (freight vs. passenger), evaluating the different alternatives and their operating cost, routing, final comparison. The students can use modern flow optimisation software packages in a computer lab setting as part of their project work. The final grade is awarded on the basis of a written case study exam and the grade from the class project.

3031 Transportation Planning and Forecasting

ECTS credits: 3
Weekly workload: 1lec+0sem+0labs+1ps+ca
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Departament of Business and Management
Faculty of Business and Management
Lecturers:
Assoc. Prof. Emil Krastev Papazov, PhD, Dept. of Business and Management, tel: 888-726,
E-mail: epapasov@gmail.com;
Pr. Assist. Prof. Daniel Yordanov Popov, Dept. of Business and Management, tel: 888-518,
E-mail: dpavlov@ru.acad.bg.
Abstract:
The topics and contents of the course take into consideration the conditions of market economy, the functioning and the requirements of the complex mechanisms in the entire hierarchy of the economic market structures. The training of bachelors of TRANSPORT ENGINEERING is complemented and assisted by the provision of a whole range of theoretical and applied knowledge on forecasting, which is the main aim of the course.
Course content:
Introduction to the subject. Fundamentals of Forecasting. Methodology of Forecasting. Methodology of Planning. Methodology and methods for transportation planning and forecasting. Planning of capital investment in transport. Instructions for developing business and strategic plans for a transport company.
Teaching and assessment:
Traditional lecture format supported by visual aids is used. A new component is the on-line lecture, which will activate student interest in applied knowledge and methods. Laboratory sessions are held in computer rooms and are practice-oriented to topics, which cover real life situations. They include doing tests, case studies and solving problems, which are used for continuous assessment. Course work is prepared individually with the help of a handbook of methodological instructions. Students can rely on individual consultations with the tutor and on group discussions too. Students are recommended to follow developments in the field of planning and forecasting as a whole and more specifically in the field of transport. The materials, which are uploaded in the E-learning platform of the University, will enable the students to make use of the advantages of on-line training.

3032 Information Systems and Technologies in Transport

ECTS credits: 5
Weekly workload: 2lec+0sem+2labs+0ps+ca
Assessment: exam
Type of exam: oral and written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Abstract:
The course contributes to developing the information culture of future transport engineers.
The students gain knowledge of information systems and technologies in transport and acquire practical skills to use computer programmes in the subject area.
Course contents:
Basic information about communication systems - information transfer and the importance of communication for transport. Announcements, signals, communication channels, transmission environments and systems. Analogue and digital systems. Data transmission. Communication networks. Cellular networks – pager, cellular telephone. Satellite communication in transport. Information system in transport. Systems for transmission of information in transport control systems. Systems for transmission of radio messages and radiodata for traffic. Systems for ensuring traffic safety.
Nature and characteristics of information. Classification and coding of information. Information Information technologies in operations in transport, administration and financial activity and planning. Information technologies in transport – nature, analysis and design. Information database of a transport enterprise. Information management.
Teaching and assessment:
The theoretical fundamentals of the course are assimilated at the laboratory classes. The students learn how to use specialized software, to work with information systems and design these. During the semester the students do a course assignment, which provides the opportunity for self-study.
The final grade is an aggregate grade based on the overall performance of the student, the end-of-semester exam results and the grade from the course assignment.

3033 Transport Management and Gradeeting

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Ivanova Pencheva, MEng, PhD, Department of Transport, tel: 888 825,
E-mail: VPencheva@ecs.ru.acad.bg.
Abstract:
The course is designed to provide the students with knowledge about the methods and approaches concerning the effective organisation and management of processes and systems in transport. The course also provides the students with basic theoretical knowledge and practical skills in the field of marketing of a transport company. The curriculum consists of two parts: marketing of the transport service and management of a transport company.
Course content:
Gradeeting environment. Characteristics of the demand and supply. Creation of a transport product. Markets. Rates and prices. Transport and channels for distribution of goods. Stimulating the sales and advertising the transport product. Information systems and investigations. International gradeeting of the transport. Characterization of transport as an object of management. Transport – structure and organisation. Planning. Management of investments and finances in transport. Human Resources Management in a transport company. Managerial decisions and information provision.
Teaching and assessment:
Lecture topics are illustrated through specific examples adopted from existing transportation practices. The lectures provide the students with knowledge required for conducting laboratory classes in the field of transport management and gradeeting.
The final grade is awarded on the basis of the overall student performance during the whole semester and end-of-semester exam results.

3034 Technical Exploitation of Transport Vehicles 2

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+0ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikolai Iliev Kolev, MEng, PhD, Department of Transport, tel.888 231
E-mail: Nkolev@manuf.ru.acad.bg
Assoc. Prof. Vasil Antonov Stoianov, MEng, PhD, Department of Repair, Reliability and Chemical Technology, tel.888 480
E-mail: VStoianov@ecs.ru.acad.bg
Pr. Assist. Prof. Aleksandar Iordanov Stoianov, MEng, Department of Transport, tel.888 231
E-mail: AStoianov@ecs.ru.acad.bg
Abstract:
The purpose of the course is to give the students basic knowledge of the technology of diagnostics, technical service and repair of the systems and the aggregates of the transport vehicles. During the practical classes students have the opportunity to analyze and evaluate the different methods and to optimize the processes.
Course content:
Methods and means of diagnostics and technical service of transport vehicles and theirs systems and aggregates. Technical processes for repair of transport vehicles. Border status. Standard technological processes for diagnostic, technical service and repair of the main systems.
Teaching and assessment:
The lectures are conducted in the traditional way and visual aids are used. During the practical classes students have the opportunity to work individually on models, real objects and stands. The grade is based on the results of the exam and of the practical classes conducted during the semester.

2253 Organisation and Management of the Servicing in Transport

ECTS credits: 5
Weekly workload: 2lec+0sem+2labs+0ps+cw
Assessment: continuous assessment
Type of exam: written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nikolai Iliev Kolev, MEng, PhD, Department of Transport, tel.888 231
E-mail: Nkolev@manuf.ru.acad.bg
Pr. Assist. Prof. Aleksandar Iordanov Stoianov, MEng, PhD, Department of Transport, tel.888 231,
E-mail: AStoianov@ecs.ru.acad.bg.
Abstract:
The purpose of the course is to give the students basic knowledge and awareness of engineering and technical issues concerning the organisation and management of servicing in transport. The course focuses on: the organisation of technological problems in technical servicing; diagnostics and operational repair of transport vehicles; organisation of the work at the working places; technological equipment; management of production processes; technological planning. The course is used to assist the students in preparing their diploma papers and real practice activities.
Course content:
Types of transport and service companies. Technology and organisation of servicing. Organisation of servicing, diagnostics and repair. Statistical model. Technological planning. Management of service activity. Choice of management strategy. Licensing.
Teaching and assessment:
The lectures enable the students to get acquainted with basic issues of the organisation and management of service activity. Practical classes based on real information develop technological and managerial decisions. The course project is developed individually. The final grade is based on the results of two tests, a summarized grade from the practical classes and the course project grade.

0379 Technical Safety

ECTS credits: 2
Weekly workload: 2lec+0sem+0labs+0ps
Assessment: oral exam
Type of exam: oral
Department involved:
Department of Ecology and Environmental Protection
Faculty of Agricultural and Industrial Engineering
Lecturers:
Prof. Vladimir Vladimirov, MEng, PSc, Department of Ecology and Environmental Protections, tel: 888 481, E-mail: vtomov@ru.acad.bg.
Abstract:
This is a general technical course. Its basic goal is for students to acquire knowledge and skills to apply analysis and synthesis of technical and organisational solutions on labour safety. The tasks that are solved in the process of training are: acquiring knowledge on methodology of analysis and synthesis of technical and production systems safety – sources, characteristics, effect, normalization, measuring and assessment of regulated dangerous and harmful production factors; acquiring knowledge on the methods of safe technical systems design; design of technical devices and argumentation of organisational solutions on labour safety; assessment of technical safety effectiveness; labour safety control.
Course content:
Technical safety – basic terms and definitions; basic methods of safe technical systems design; Mechanical safety of technical systems; Electrical safety; Electromagnetic safety; Emission and emission safety; Noise and vibration safety; Radiation safety; Ergonomic fundamentals of technical and production systems safety; Safety actions; Assessment of effectiveness of safety assurance of production equipment and processes; Control of labour safety.
Teaching and assessment:
The lectures are made clear with visual aids in conformity with the specific features of the degree programme. Laboratory classes have experimental and research character. Students should be well prepared in advance. Students will sit for two tests. The final grade is based on the results from test papers, tests and participation in the lab classes.

0388 Traffic Safety

ECTS credits: 4
Weekly workload: 2lec+0sem+2labs+0ps+ca
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Pr. Assist. Prof. Jivko Gelkov, MEng, tel: 888-609, E-mail: JGelkov@ecs.ru.acad.bg.
Abstract:
The aim of the course is to give the students knowledge on traffic safety problems, to study the estimation methods and traffic safety methods and measurements. The methods for traffic accidents reconstructions are presented in detail. Previous knowledge of mechanics, transportation infrastructure, vehicles and vehicle diagnostics is necessary. The subject is an essential contribution to the professional training of transport engineers.
Course contents:
Traffic safety problems. Structure and functions of the Driver – Vehicle – Transport infrastructure - Environment system. Vehicle safety, safety of transport infrastructure elements. Transport accidents. Methods for estimating traffic safety and transport risk. Technical expertise of traffic accidents (traffic accidents reconstruction).
Teaching and assessment:
Lectures are conducted in a traditional form using appropriate technical aids. The laboratory classes are practice-oriented. Assessment is based on three tests. The course work is prepared and submitted in the pre-final week and its grade is included in the final grade that is calculated according to a formula announced at the first lecture.

0398 Traffic Engineering and Control

ECTS credits: 8
Weekly workload: 3lec+0sem+3labs+0ps+cw
Assessment: exam
Type of exam: oral and written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Pr. Assist. Prof. Jivko Gelkov, MEng, tel: 888-609, E-mail: JGelkov@ecs.ru.acad.bg.
Abstract:
The students are introduced to the problems of traffic engineering and control, the methods and devices used and the methods for assessment of projects I this area.
Course contents:
Traffic problem. Structure of the Driver – Vehicle – Road system. Internal and external relations. Characteristics of traffic flow and relations. Road capacity. Methods and devices for research of the traffic flow. Basic tasks and principles for traffic engineering. Basic methodologies for development of traffic engineering projects. Traffic flow as a management issue. Management structure scheme. Classification of control devices. Devices for off management at crossroads. Adaptive management of traffic. Devices for traffic information – traffic detectors. Devices for adaptive management. Co-ordinated traffic management and systems for co-ordinated traffic management.
Teaching and assessment:
The teaching material is presented through lectures. The practical classes are practice-oriented. The course work is based on data about a hypothetical object.
The final grade is awarded on the basis of a written exam, the course work grade, participation in the practical classes and course attendance.

0409 Commercial Exploitation of Transportation

ECTS credits: 5
Weekly workload: 3lec+0sem+0labs+1ps+ca
Assessment: exam
Type of exam: written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Ivanova Pencheva, MEng, PhD, Department of Transport, tel: 888 825,
E-mail: VPencheva@ecs.ru.acad.bg.
Abstract:
The purpose of the course is to give the students basic theoretical knowledge and practical skills concerning transportation for business purposes. Emphasis is put on the main principles of the organisation of the commercial transportation. Definite problems concerning the forwarding activities of a transport company are discussed in details during the practical classes. By using the potential of the computer technologies and the information systems the students can: acquaint themselves with standards and documents on-line, fill in transportation documents on-line, process a lot of information.
Course content:
Principles of organisation of commercial exploitation. Basic load and freight characteristics. General rules applying to commercial operations in transport. Delivery terms of goods and traveling duration of passenger transportation. Conservation of goods during their transportation. Intermodal transportation. Freight-forwarding. Transport documents for international trade. International classificatory and code symbols. Rates.
Teaching and assessment:
Lectures are conducted in a traditional format. The theoretical content of the course is illustrated by practical examples. Presentations, video and multimedia materials are provided. The lectures are discussion-oriented. The practical exercises include collecting information and solving specific problems. Internet is used as a teaching and learning tool too.
The final grade is based on the student's results from the exam and his/her performance during the semester.

0444 Freight-Forwarding Technologies and Organisation

ECTS credits: 6
Weekly workload: 3lec+0sem+0labs+1ps+cw
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Eng. Velizara Pencheva, MEng, PhD, tel: 888-825, Vpencheva@ecs.ru.acad.bg.
Abstract:
The course provides knowledge of the process of cargo preparation, methods for cargo consolidation, equipment used to handle consolidated cargo, consolidation schemes and organisation of the integration process for different types of transportation.
Course content:
Methods and means to create and manipulate consolidated cargo. Types of technological processes for the manipulation and freight forwarding of consolidated cargo. Technology and organisation of forwarding for raw materials and constructions as well as manufacturing finished goods. Specifics of forwarding agricultural products using highway. Multimodal transportation practices.
Teaching and assessment:
Traditional lecture and discussion format with wide utilization of practical business cases and visits to transportation centers. In addition, the students learn how to use sophisticated process optimisation software packages. In the course of the semester the students work on a course project which allows them to independently explore the nature of the processes studied in class. The final grade is based on exam results and overall student performance during the semester.

0456 Passenger Transport

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps+ca
Assessment: exam
Type of exam: oral and written
Departments involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Pr. Assist. Prof. Petko Tepavicharov, MEng, tel: 888 231, E-mail: PTepavicharov@ecs.ru.acad.bg.
Abstract:
The subject introduces the students to the importance of transport for the development of the large cities and conurbations, the transport needs and transport services for passengers of all kinds of mass urban passenger transport. Transport planning decisions of the city territory are analysed and some approaches and algorithms are given for estimating and planning of transport schemes, routes, schedules and management of mass urban passenger transport and intercity traffic.
Course contents:
Development and classification of passenger transport. Characteristics and classification of urban passenger transport. Mobile structure and infrastructure of urban road and railway transport. Urban transport networks. Transport mobility, passenger flows and methods for studying these. Working schedules of autobuses, trolleybuses, and tramways in urban and countryside routes. Schedules. Organisation of intercity passenger transport. Quality of passenger transport services.
Teaching and assessment:
The teaching materials are given at lectures. Practice-oriented laboratory classes are conducted including research of different types of subsystems of the overall system of mass urban passenger transport. The course work is based on data from real life and is the subject of interrelations of different subsystems.
The final grade is based on a written and oral exam.

0603 International Transportation

ECTS credits: 4
Weekly workload: 4lec+0sem+0labs+2ps
Assessment: exam
Type of exam: Written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, Vpencheva@ecs.ru.acad.bg.
Abstract:
The purpose of the course is to acquaint the students with the methods for building a European product and transport gradeet, international transportation infrastructures, basic international regulations (conventions, agreements, etc.) and documents required for international transportation of goods using different modes of transport.
Course content:
International transport organisations for railway transport, waterway transport, motor transport, airway transport. International transportation of goods with different modes of transport – agreements. Insurances on signing international contracts. International conventions and agreements concerning motor transport and other modes of transport. Organisation of international transport. Building a European product and transport gradeet.
Teaching and assessment:
Lecture topics are specified by practical classes, which acquaint the students with the basic conventions, agreements and their annexes. Students get familiar with the different types of transport documents and their legal interpretation. By visiting border check-points the students get acquainted with the procedures of crossing the borders for haulage vehicles. The students learn how to work with existing specialised software and how to use the international information systems.
The final grade is based on the overall student performance in class and the ability to work with international transport documents demonstrated at the exam.

0602 Transportation Modeling and Optimisation Methods

ECTS credits: 4
Weekly workload: 3lec+0sem+3labs+0ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Pencheva, MEng, PhD, office tel: 888-825, Vpencheva@ecs.ru.acad.bg.
Abstract:
Introduction to operations research and modeling. Process optimisation is applied to actual business cases adopted from different transportation practices.
Course content:
Mathematical modeling as a research tool. Stages in the development of a practical mathematical model. Linear programming – problems, geometrical interpretation, simplex method. Transportation problems – solution methods. Transportation problems with additional conditions.
Teaching and assessment:
The principles of the theory of optimisation are taught through a combination of lectures, cases, and lab classes in which the students use optimisation software packages. The final grade is based on student performance in class and final examination results.

0714 Transport Ecology

ECTS credits: 4
Weekly workload: 3leb+0sem+3labs+0ps
Assessment: continious assessment
Type of exam: Written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering
Lecturers:
Prof. Kiril Barzev, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 432,
E-mail: barzev@ice.ru.acad.bg.
Abstract:
The subject gives knowledge about the basic interaction between internal combustion engines, energy sources, environment and the harmful consequences for both man and nature. It requires profound knowledge of ongoing processes in internal combustion engines as well as basic knowledge of chemistry and thermodynamics.
Course content:
Engine emissions and their contribution to the global environmental pollution. Physical and chemical processes in the formation of basic toxic engine exhaust emissions and influencing factors. Measurement and legislation of internal combustion engines toxic exhaust emissions. Ways of toxic components reduction in spark-ignition and compression-ignition engines.
Teaching and assessment:
During the laboratory classes the students assimilate the concepts about formation and measurement discussed at the lectures. Final assessment is based on two grades obtained from minimum two tests during the semester.

0744 Business and Financial Management of a Transport Company

ECTS credits: 4
Weekly workload: 3lec+0sem+0labs+3ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Business and Management
Faculty of Business and Management
Lecturers:
Assoc. Prof. Emil Krastev Papazov, Dept. of Business and Management, tel: 888-726,
E-mail: epapasov@gmail.com;
Pr. Assist. Prof. Daniel Yordanov Popov, Dept. of Business and Management, tel: 888-518,
E-mail: dpavlov@ru.acad.bg;
Pr. Assist. Prof. Aneliya Pencheva Lyubenova, Dept. of Business and Management, tel: 888-347,
E-mail: alyubenova@ru.acad.bg.
Abstract:
The topics and contents of the course take into consideration the conditions of gradeet economy, the functioning and the requirements of the complex mechanisms in the entire hierarchy of the economic structures. The training of the students is supported by the provision of a whole range of theoretical and applied knowledge on business and financial management of transport companies, which is the main aim of their education. Some of the objectives for the students are: a) to acquire the knowledge needed to understand the newest phenomena in management; b) to study the methods and techniques of company management; c) to acquire knowledge and skills needed for the strategic management of transport and its main unit, the transport company; d) to acquire theoretical and practical knowledge of managing the main financial resources of a transport company.
Course content:
Introduction to the course. Methodology of management. Introduction to strategic management. Strategic planning for a transport company. Financial management of a company. Money value and cash flow management. Investment management and investment policy. Financial analysis and planning in a transport company.
Teaching and assessment:
Some of the topics are delivered in a traditional lecture format supported by visual aids.
The new components are as follows: a) on-line lectures and tutorials which will activate student interest in applied knowledge and methods; b) main topics of the lecture course are published on a CD and uploaded on the Internet. The course envisages the administering of tests, individual and group consultations. Self-study time is individual for everybody.

1445 Transport Systems Innovations

ECTS credits: 4
Weekly workload: 3lec+0sem+0labs+3ps
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, Vpencheva@ecs.ru.acad.bg
Pr. Assist. Prof. Asen Tsvetanov Asenov, MEng, PhD, Department of Transport, tel.: 888 605,
E-mail: asasenov@ru.acad.bg.
Abstract:
The purpose of the course is to give the students knowledge concerning the following topics: social, economic and ecological problems of the transport systems; main characteristics of the international, local, frontier and national transport systems; internal and external perspectives concerning the development of the transport systems; the relation customer - transport system and quality of the transport service; basics of the transport system innovation; new technologies used in transport systems. Practical problems are solved during the practical classes.
Course content:
Transport systems. Introduction, conceptions and characteristiques. Social, economic and ecological problems of the transport systems. Internatioanal transport systems. National transport systems and their subsystems. Transport systems - internal and external perspectives concerning their development. Relations and interrelation between the consumers of the transport service and the transport service. Characterization of the transport service and the service quality. Models used for transport systems investigation. Innovations and innovation processes. System of indicators used for assessment of the innovative activities efficiency in transport. Financial base necessary to implement a transport innovation. Determination of the risk when conducting transport innovation activity and methods for its reducement. State policy and regulatory measures that concern the innovative activities. New technologies used in the transport systems.
Teaching and assessment:
Lecture topics are complemented by practical classes and self-work. Students gain knowledge by solving different practical problems from the field of study. During lectures and laboratory classes, presentations, video and multimedia materials are provided. The practical classes are conducted in a laboratory equipped with computers. Internet is used as a teaching and learning tool. The students have to be familiarised with the lecture material in order to be able to take part in the practical classes.

1461 Technologies in Vehicle Service

ECTS credits: 4
Weekly workload: 3lec+0sem+0labs+3ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Nilolai Iliev Kolev, MEng, PhD, tel: 888-825, Nikolev@ru.acad.bg
Pr. Assist. Prof. Alexander Jordanov Stoyanov, MEng, PhD, Dept.of Transport, tel. 888 231,
E-mail: AStoyanov@ru.acad.bg.
Abstract:
The course gives basic knowledge about the up-to-date technologies for diagnostics and maintenance of transport vehicles aggregates and systems.
The practical classes acquant the students with the characteristics of different modern vehicle models.
Course content:
Diagnostic of electrical systems used for control of the transport vehicle aggregates and systems. Diagnostics and technical maintenance of transport vehicle aggregates and systems.
Teaching and assessment:
Lectures are based on the classical approach. Presentations, video and multimedia materials are provided. The practical classes cover the material previously studied in class. The students have the chance to observe and analyse real diagnostical and maintenance processes of the transport vehicles.
The final grade is formed on the base of the grade obtained from the exam or on the base of the average grade obtained from the two tests during the semester (if it is a good grade). After discussion the final grade is formed.

1460 Analysis and Reconstruction of Traffic Crashes

ECTS credits: 4
Weekly workload: 3lec+0sem+0labs+3ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Eng. Mitko Dimitrov Marinov, MEng, PhD, tel: 888-825, E-mail: MDMarinov@ru.acad.bg
Assist. Prof. Jivko Rusinov Gelkov, MEng, tel: 888-609, E-mail: JGelkov@ru.acad.bg.
Abstract:
The purpose of the Course Analysis and Reconstruction of road accidents is for the students to learn about: legal documents regulating the activities of judicial experts, methods and means of expert studies on road accidents, methods for testing and analysis of road accidents. Students acquire skills for conducting research and arriving at conclusions at autotechnical expertise executions.
Students need to have prior knowledge of mechanics, transportation equipment, testing, maintenance and repair of automobiles, organisation and safety of traffic and skills with computers.
Course content:
Types of expertise for road accidents. Organisation of expertise in Bulgaria. Purpose and goals of autotechnical expertise. Competence, rights, obligation and responsibility of the judicial expert. Materials for making expertise in road accidents. Stages of expertise. Expert conclusion.
Features of pedestrian traffic. Safe speed. Basic concepts, definitions and classifications of road accidents with pedestrians. Common methods of expert examination. Simulations of accidents with pedestrians caused by limited or reduced visibility. Study of road accidents by cyclists and motorcyclists. Evaluating the cars and damage to them.
Teaching and assessment:
Training is done through lectures and seminars. Students learn the theoretical foundations of the material that is supplemented with relevant case studies from reality. Slides, posters and charts are used for visualization. Students are required to prepare for the workshops.
Practical classes prepare the students for the oral exam. Three tests in theory are held. The semester is validated on the conditions specified in the Rules of the University of Ruse.
The final assessment is determined by a written exam. It includes the open test with solving the case and success in a written exam. The formula 0.5test + 0.5exam - 0.1absent is used.

1506 Self-Preparation for the Final Project

ECTS credits: 4
Weekly workload: 0lec+0sem+0labs+10ps
Assessment: oral test
Type of exam: oral
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, E-mail: Vpencheva@ecs.ru.acad.bg;
Assoc. Prof. Nilolai Kolev, MEng, PhD, tel: 888-825, E-mail:Nkolev@ecs.ru.acad.bg
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-825, E-mail: MDMarinov@manuf.ru.acad.bg
Abstract:
The pre-diploma practice aims to equip the students with knowledge and practical skills on issues connected with transportation, commercial operation, company management and gradeeting; traffic management and traffic safety; management of technical maintenance, diagnostics and repair of transport vehicles; organisation and management of servicing, technological planning for transport companies; transport legislation, information collection and data processing.
Course content:
Main legislative documents in transport. Planning of transport and transport operations. Material resources. Financial management of the company. Company information flows, information systems and technologies. Organisation and company management. Technical operation. Transport vehicle maintenance. Study of engineering tasks connected with transport and presenting a matter of interest for the company.
Teaching and assessment:
The diploma paper supervisor provides the methodology for the pre-diploma practice. During the practice the students work on tasks assigned to them, take part in the manufacturing process and prepare their diploma paper. Attendance is monitored by the diploma project supervisor and a representative of the firm. As a result of the work done and the diploma materials prepared by the student the pre-diploma practice is validated by the academic supervisor.

1507 Bachelor Thesis

ECTS credits: 10 **Weekly workload**:
Assessment: official defense **Type of exam**: oral
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering
Consultants:
All lecturers from the Department of Transport
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 the opportunity to the 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 contains: a calculations-based explanatory note and graphical part.
Teaching and assessment:
The Department of Transport provides: the organisation of the collecting, confirming and announcing of suggestions for Bachelor thesis; the distribution of themes and research leaders among students; the diploma practice organisation; the supervision, review and presentation of the Bachelor thesis.
Weekly tutorials with the research leaders are planned for the students. Then the process of the execution of the given assignment is monitored.
Final year students present their Bachelor thesis in front of the State Examination Board.

POSTGRADUATE PROGRAMS

POSTGRADUATE STUDIES IN AUTOMOTIVE ENGINEERING

PROFESSIONAL STANDARDS
OF A MASTER IN

AUTOMOTIVE ENGINEERING

Degree programme **Automotive engineering**
Educational Degree - **Master**
Professional Qualification: **Master of Engineering**
Term of education: **1 year (2 terms)**

Aims: The main aim of the AUTOMOTIVE ENGINEERING degree course is to educate and train highly-qualified masters of engineering in the field of technical exploitation, maintenance, testing and manufacture of transport vehicles.

The professional suitability of a Master of AUTOMOTIVE ENGINEERING is to work as highly-qualified first line and middle manager in companies operating in the transport sector of the national economy. As a result of their university education and training the students should acquire technical and managerial knowledge and skills in one of the three areas of study:

- technical operation and servicing of transport vehicles (TVs);
- manufacture, testing and investigation of transport vehicles;
- manufacture, testing and investigation of internal combustion engines (ICEs).

The **general profile** engineering training of Masters of AUTOMOTIVE ENGINEERING includes the provision of up-to-date knowledge and information about the trends in the development of ICE and transport vehicles, numerical methods, methods for optimization and mathematical processing of experimental data, use of specialist engineering software and knowledge of the economic fundamentals of the modern company.

The **special profile** training of Masters in the areas of Manufacture, testing and investigation of transport vehicles, Manufacture, testing and investigation of internal combustion engines obtain specialist knowledge about the latest theoretical aspects of ICE and TVs, about testing and investigation of ICEs and TVs, the application of computer systems in design and the methods for CAD of ICEs and TVs.

The Masters in the area of Technical Operation and Servicing of TVs obtain specialist knowledge about the technical operation of TVs, modern tools for diagnostics and servicing, organization and management of servicing and the use of information technologies in servicing.
The Masters in the area of Manufacture, testing and investigation of transport vehicles obtain additional specialist knowledge of one of the following – automobiles, tractors and fork-lift trucks, special purpose transport vehicles, buses, trolleybuses and road constructing machinery.
The Masters in the area of Manufacture, testing and investigation of internal combustion engines obtain additional specialist knowledge of one of the four directions – fuel systems of benzene or diesel ICEs, ecological issues with ICEs and technical diagnostics and repair of ICEs.

General and special skills
Masters of AUTOMOTIVE ENGINEERING acquire skills for carrying out highly-qualified activities and managerial functions in the manufacture, testing and investigation of TVs as well as in the technical operation, servicing and marketing of TVs. The Master of Engineering in TRANSPORT ENGINEERING should: be capable of doing research and engaging in the management of the development, manufacture and maintenance of TVs; do technical and marketing research; organize and manage road transport; analyse and evaluate the efficiency of transport vehicles manufacture and usage; perform teaching and other activities in the field of transport.

Job opportunities
The graduates of the AUTOMOTIVE ENGINEERING master's degree course can be employed as highly-qualified experts and managerial staff in companies and institutions working in the following fields: manufacture of TVs and spare parts, testing and investigation of TVs, technical checks of TVs and certified checks, licensing and TV certification, technical operation and servicing of TVs, teaching and research, as experts in national agencies and ministries connected with TVs and vehicle engineering.

CURRICULUM

of the Master's degree course in

AUTOMOTIVE ENGINEERING

Code	*First Semester*	*ECTS*
0382	Transport Machinery	8
0384	ICEngines in Transport Vechicles	8
0433	Monitoring and Management of Technical Stand Transport Machinery	5
0400	Software for Engineers	6
0401	Economic Foundations of the Company	3
	Total Credits for the Semester:	***30***

Code	*Second Semester*	*ECTS*
	Module A: ICE and TE	
0402	Requirements to Vehicle Constructions	4
0403	Training and Research of Internal Combustion Engines and Transport Vehicles	4
0405	Computer System for Design	3
0406	Emissions Standards of Automotive Machinery and Methods to Meet Them	2
	Elective courses:	
0323	Specialised Automobile Transport Means	2
0351	Buses and Troleybuses	2
0358	Road-building Machinery	2
0319	Fuel Systems of Internal Combustion Engines	2
0625	Technical Diagnostics and Troubleshooting in ICEs	2
	Module B: Service of Transport Machinery Module	
0434	Service of TM	5
0627	Technical Resources for Diagnostics and Service	3
0631	Organization and Management of Service	3
0406	Emissions Standarts of Automotive Machinery and Methods to Meet Them	2
0436	Application Software in Service Activity	2
0626	Master thesis	15
	Total Credits for the Semester:	***30***

Total Credits for the Program: 60 ECTS Credits

0382 Transport machinery

ECTS credits: 8
Weekly workload: 4lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Rosen Ivanov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 888 524,
E-mail: rossen@ru.acad.bg;
Assoc. Prof. Rusi Rusev, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 888 526,
E-mail: rgr@ru.acad.bg;
Assoc. Prof. Borislav Angelov, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 888 527,
E-mail: bangelov@ru.acad.bg.
Abstract:
The course covers trends of main automotive performances development, development of automotive conceptions and new constructions. Problems concerning the improvement of automotive performances and opportunities to solve them by introducing new mechanisms and technical devices are considered. The students are educated to predict future performances of transport machines.
Course content:
Fundamentals of technological prognosis. Development of automobile production and market. Development of agriculture tractor production and market. Automotive conceptions. Body and external form of automobiles. New constructions in automobiles, related to safety and reliability. Multi-speed and planetary gear boxes. Hydraulic transmissions. Automatic transmissions. Electronic systems in transport machines. Frame and wheels. Active suspension. Working equipment of agriculture tractors – electronic systems, economical PTO etc. Behaviour of vehicles in case of casual external influences. Nonlinear mechanical systems in transport machines. Comfort. Steerability and stability of vehicles. Noise and vibrations.
Teaching and assessment:
During training lecturers use firm materials and new articles in leading magazines, and specialized teaching films from companies-leaders in the automotive market. New technical decisions for performance improvement and effect of their application are considered with attention. Alternative decisions of problems are considered. Practical classes give the students opportunity to study and analyse new technical solutions and to discuss problems and development trends of vehicles.

0384 IC Engines in Transport Vehicles

ECTS credits: 8
Weekly workload: 4lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lectures:
Prof. Kiril Barzev, MEng, DSc, Dept. of Internal Combustion Engines, tel.: 888 732,
E-mail: barzev@ru.acad.bg
Assoc. Prof. Hristo Stanchev, MEng, PhD, Dept. of Internal Combustion Engines, te.l: 888 373,
E-mail: hstanchev@ru.acad.bg
Abstract
The main purpose of the course is to acquaint the students with alternative engines (Wankel, Gasturbine, Stirlling and Compound), conventional and alternative fuels, fuel systems and their characteristics for both, gasoline and diesel engines and different type of working machine.
Course content:
Alternative engines and their characteristics. Energy sources. Cycle analysis of fuels. Conversion of Engines. Fuel systems for gasoline engines. Fuel systems for diesel engines. Adaptation of engines to working machine.
Teaching and assessment:
Modern scientific publications and books are used. Multimedia is used. The main focus is on new types of engines, fuel economy and emission reduction.

0433 Monitoring and Management of Technical Stand Transport Machinery

ECTS credits: 5 **Weekly workload:** 3lec+1sem+0labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Totju Tanev Totev, MEng, PhD, Department of Automobiles, Tractors and Fork-lift Trucks, tel. 888-528, E-mail: totev@ru.acad.bg;
Pr. Assist. Prof. Aleksander Jordanov Stoyanov, MEng, PhD, Dept. of Transport; tel.: 888 231, E-mail: Astoianov@ru.acad.bg.
Abstract:
Studying the course, the students will acquire basic knowledge about the reliability of TT and the alteration of their technical state in the process of exploitation; theoretical bases of technical diagnostics; methods and means for diagnostics, used in defining the technical condition of TT; managing the processes of the technical maintenance of TT.
Course content:
Technical state. Basic terms and definitions. Alteration of technical state of TM in the process of exploitation. The reliability of TM in exploitation. Regularities of technical state of TM. Bases of technical diagnostics. Systems for technical maintenance of TM. Diagnostics of TM by acoustic parameters; by the structure of the products in exhaust oil; by functional parameters. Managing the processes of the technical maintenance of TM Prognostication of technical state and reliable indexes of TM.
Teaching and assessment:
Lectures are conducted in the classical way, using slides, projectors and general schemes. LI strengthens the material from the lectures with individual work done by the students. The grade is formed on the basis of student performance during the exam and the entrance control of LU.

0400 Software for Engineers

ECTS credits: 6 **Weekly workload:** 2lec+0sem+0labs+3ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Departament of Informatics and Information Technologies
Faculty of Natural Science and Education.
Lecturers:
Assoc. Prof. Margarita Teodosieva, MEng, PhD, Dept. of Informatics and Information Technologies, tel: 888 464, E-mail: mst@ami.ru.acad.bg.
Abstract:
The purpose of this course is to introduce fundamental principles of computer application in the practice. The students will gain knowledge and skills in:
- creating and implementing information systems in the area of their activities;
- preparing presentations for conferences, science and practical workshops etc.;
- arranging reports, papers, advertisement materials and other documents;
- producing their personal Web pages.

Course content:
Introduction to Office 2000. DBMS, organisation and implementation of databases, query management, optimisation and execution. Analysis of relational schemes. Normal forms. Normalization. Database applications Access 2000 - design and creation of databases. Design and implementation of databases and information systems within Access 2000 environment. Advanced features of Windows 2000, Word 2000 и Excel 2000. Web pages development within FrontPage 2000. Presentations design using PowerPoint 2000.
Teaching and assessment:
The course comprises lectures and workshops.
The lectures introduce the students to the topic. Some details are discussed and suitable examples are given.
Within workshop sessions the students are grouped in teams. Each team develops their own example of database, presentation and Web page. The development progresses weekly according to the syllabus.
Practical skills are assessed continuously through review of documents, presentations and software produced by the students.
During the semester the students do 2 tests on the lecture topics.

0401 Economic Foundations of the Company

ECST credits: 3
Weekly workload: 2lec+1sem+0labs+0ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Economics
Faculty of Business and Management.
Lecturers:
Assoc. Prof. Lyubomir Dimitrov Lyubenov, MEcon, Department of Economics, FBM, tel: 888 347,
E-mail: llyubenov@ru.acad.bg
Abstract:
The necessity of taking the course is inculcated by the striving for successful adaptation of the managers and the contractors to the specific character of the marketing infrastructure in the transport sector. The course objective is to form knowledge and skills for precise assessment of the processes and phenomena in the sector of ransport by applying modern economic methods and approach.
Course content:
The teaching is done in three modules. Economic foundations of the production - capital, long-term and short-term assets and company personnel; financial basis of the production - expenditures, price and price-formation, profit and profitability, financial report of the firm. Planning and budgeting the activity of the firm - planning, making the business plan and the budget of the firm.
Teaching and assessment:
The lectures are held according to the classical pedagogic forms by using a slide projector. The workshops aim at solving practical tasks in the sector of transport.
The requirements for having the term validated and knowledge assessment are in accordance with the internal regulations of the academic affairs.

0402 Requirements to vehicle constructions

ECTS credits: 4
Weekly workload: 3lec+0sem+0labs+3ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Rosen Ivanov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.: 888 528,
E-mail: rossen@ru.acad.bg;
Assoc. Prof. Borislav Angelov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel.:888 527,
E-mail: bangelov@ru.acad.bg;
Abstract:
The subject provides the students with knowledge about the modern requirements to vehicle constructions, defined in the national and international regulations as EC directives, EEC regulations etc., and concerning vehicle's construction in general and requirements to the different systems and mechanisms of vehicles.
Course content:
Requirements to the light system and its elements. Requirements to the steering system. Requirements to the brake system and concerning braking performance. Requirements to the security systems of the vehicle – central locking, alarm etc. Requirements to the safety systems – safety belts, airbag, seats, lateral safety devices of trucks. Requirements to the hitch devices. Requirements concerning tyres. Requirements to the built-in ICE and exhaust emissions. Requirements to the vehicles powered by an electric battery or alternative fuel.
Teaching and assessment:
During training they use Bulgarian and international regulations, firm materials, new articles in leading magazines. The multimedia is used at lectures, where students receive the essential information. The individual work in workshops supports lecture topics.. The final marks are formed on the basis of the results from the whole semester.

0403 Training and Research of Internal Combustion Engines (ICEs) and Transport Vehicles (TVs)

ECTS Credits: 4 **Weekly workload:** 3lec+0sem+0labs+3ps
Assessment: exam **Type of exam:** written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks and Dept. of Internal Combustion Engines Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Totju Tanev Totev, MEng, PhD, Department of Automobiles, Tractors and Fork-Lift Trucks, tel. 888-528, E-mail: totev@ru.acad.bg;
Assoc. Prof. Atanas Liubenov Iliev, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888-272, E-mail: ailiev@ru.acad.bg.
Abstract:
The course provides the students with knowledge about the principles, methods and means of measurement while testing and investigsating ICEs and TVs, in relation to the improvement of their power, dynamic, toxic, acoustic and strength characteristics. The students obtain skills to choose testing equipment and to plan and realize engineering research.
Course content:
Measuring while testing and investigating ICEs and TVs. Methods of planned experiment. Theoretical formulations about modern research of ICE and TV characteristics.
Teaching and assessment:
The lectures and the workshops are organized according to classical technology with employment of folios, computers and laboratory test stand and equipment. Before the workshops an entrance check of the students about their training on the regular topics is organized. For each workshop a report is prepared. At the end of the semester a check on all lectures is done in a written form. If the results are good the student may be exempt from examination.

0405 Computer Systems for Design

ECTS credits: 3 **Weekly workload:** 2lec+0sem+0lab+3ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Emilia Anguelova Anguelova, MEng, PhD, Dept. MME, tel. 888-615, 825-663,
E-mail: ang@ru.acad.bg.
Abstract:
With the help of this course, the students will become familiar with new methods and approaches to the design, provoked by the usage of CAD systems and their capabilities. Major elements of the course are the problems in creation and usage of different types of blocking contours – geometrical, power and parametrical. With their help the problems of design of cylindrical reducers, mechanisms with interconnected gears, gear boxes and others, are solved on a new level, as well as the problems of higher unification in families of gear devices. Powerful basis for optimization based on complex criteria is provided. New modern methods for creation of design documents are studied.
Course content:
Geometrical optimization of gear drives. Geometrical contours of the kind "a_w-x". Design and optimization of planetary reducers, train gears. Engineering analysis of the prepared design documentation and possibilities for correction for optimization. Methodology of work with SolidWorks. Modeling of parts and assemblies.
Teaching and assessment:
The lectures and workshops are carried in a computer room with capabilities for demonstrations and work with CAD. The student must establish an approach to the optimization of gear drives based on different criteria. He/she must understand the problems of train gears and the possibilities of their solving. He/she must be familiar with the present computer software and capable to use it. He/she must apply the knowledge and skills gained to solving real world problems, suggested by a given manufacturer.

0403 Emissions Standarts of Automotive Machinery and Methods to Meet Them

ECTS credits: 2
Weekly workload: 2lec+0sem+0labs+2ps
Assessment: continuous assessment
Type of exam: oral
Department involved:
Departament of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Kiril Barzev, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 432,
E-mail: barzev@ice.ru.acad.bg
Abstract:
The course develops further the students' knowledge about the ecological problems of transport mentioned briefly in the bachelor degree programme and adds new aspects related to measurement, lisencing and control of the engine's exhaust emissions. The students study procedures to investigate and evaluate the vehicle's ecological parameters. It is necessary to deepen the knowledge on ongoing combustion processes into internal combustion engines, as well as the basic knowledge in chemistry, general ecology and physics.
Course content:
Emission measurment of automotive vehicles and procedures for measuring of harmful emissions. Determining the air ratio of the fuel mixture through the content of the exhaust gases. Current and future standards for the newly manufactured vehicles, as well as for the existing ones: requirements and exhaust emissions analysis. Testing riding cycles for licensing those already in use. Control of harmful emissions with compression ignition engines – current and future solutions. Noise and vibrations in ICE and TM. Sources, reasons for origin, distribution, measuring and elimination. Standards and norms. Urban solutions to the problem.
Teaching and assessment:
The delivered concepts about the investigation, measurement and control of engine exhaust emissions, noise and vibrations are taught through practical classes. The test is written. The score is finalized after an interview with the student.

0323 Specialized Automobile Transport Means

ECTS credits: 2
Weekly workload: 3lec+0sem+0labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lectures:
Prof. Dimitar Jordanov Stanchev, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks,
tel.888 527, 888 545, E-mail: dstanchev@ru.acad.bg.
Abstract:
The purpose of the course is to acquaint the students with the constructions and principles of design and usage of specialized transport means (STM). It will teach them to perform strenght calculations and to assess the technical level of the machines and their aggregates.
Course content:
Classification and type of the specialized automobiles (A) and road trains (RT). Technical level of STM. Assembly schemes and construction characteristics of the automobiles – traction engines and trailing transport means. Design and calculation of the board type of A and RT with lifting trucks and dumpers; A and RT cisterns; A and RT caravans; A and RT with skeleton load-carriage constructions (for long loads, heavy undivided loads) and separate mechanisms, aggregates and STM mechanisms (frames, tractive and bearing tractive hanging mechanisms, cabins, rotable mechanisms.
Teaching and assessment:
In the lectures methods for theoretical determination of the technical level and strength calculations of STM are studied. Analysis of constructions and design of STM is made in the practical classes. Problem solving controls the continuous preparation of the students. Boards, catalogues, viewers are used in teaching and automotive transport firms are visited. A written exam and oral testing assess the final preparation of the students.

0351 Buses and Trolleybuses

ECTS credits: 2 **Weekly workload:** 3lec+0sem+0labs+0ps
Assessment: exam **Type of exam:** written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Ivan Iliev Evtimov, MEng, PhD, Department of Automobiles, Tractors and Fork-lift Trucks, tel. 888 527, E-mail: ievtimov@ees.ru.acad.bg.
Abstract:
The course objective is to familiarize students with the basic theory and construction of buses and trolleybuses, as well as with the specific features of the vehicles construction and exploitation parameters. Prerequisite courses are: Physics, Mechanics, Machine Elements, Automotive Engineering, and Tractors, Automobiles and Trucks Engineering. Upon completion of this course, students will have the opportunity to find a job in the field of trolleybus and bus manufacturing and maintenance.
Course content:
Introduction. Classification. Travelers compartment design and arrangement. Main systems positioning. Basic construction requirements. Choice of a constructive type. Transmission. Chassis. Suspension. Brake system. Electrical systems. Trolley fork.
Teaching and assessment:
During lectures students become acquainted with the basics of trolleybuses and buses. During laboratory classes students are required to put their theoretical knowledge to practice. The laboratory classes are dedicatedto different topics, and the students are supposed to prepare a protocol after each of them. The students are given the opportunity to see the professor during his office hours for further clarifications. The final grade is based on the final written examination.

0358 Road-building Machinery

ECTS credits: 2 **Weekly workload:** 3lec+0sem+0labs+0ps
Assessment: exam **Type of exam:** written and oral
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Borislav Georgiev Angelov, MEng, PhD, Dept. of Department of Automobiles, Tractors and Fork-Lift Trucks, tel: 888 457, E-mail: bangelov@ru.acad.bg.
Abstract:
The Road-building Machinery course aims to equip students of Transport Engineering with knowledge about the structure, technical and economic indicators, and methods for investigation of road-building machinery. The course also deals with questions connected with types of road surfaces and road surfacing technologies.
The subject requires knowledge of the structure, theory, design and testing of transport vehicles, hydro- and pneumatic machines and drives, which the students acquire during the bachelor degree course in Transport Engineering.
The knowledge gained provides better job opportunities for students who have done the Master's degree course in Transport Engineering, especially in the field of manufacturing and operating of road-building machinery.
Course content:
Introduction to the subject, types of road surfaces and manufacturing technologies, control systems and movement of road-building machinery, excavating machines, surface-cutting and excavating, one bucket excavators, multi-bucket excavators and canal excavators, loading machines, bulldozers, scrapers and graders - structure, classification, technological processes, testing and investigation methods, possibilities for automation, asphalt and road surfacing machines, asphalt-mixing machines, asphalt-spreading machines, rollers – structure, classification, technological processes, and possibilities for automation. .
Teaching and assessment:
The course makes use of road-building machinery, laboratory equipment, measuring equipment, models, slides and transparencies.
The methods for conducting the laboratory classes are discussed at the beginning of each session. Then the students work on their own supervised by the lecturer. Each topic is followed by a report which is later defended.
The exam consists of a written part followed by a discussion if necessary. Final assessment is based on the exam results and the marks for the laboratory classes' reports.

0319 Fuel Systems of Internal Combustion Engines

ECTS credits: 2
Weekly workload: 3lec+0sem+0labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Hristo Stanchev, MEng, PhD, Dept. of Internal Combustion Engines, tel.: 888 373,
E-mail: hstanchev@ru.acad.bg
Assoc. Prof. Mladen Bogdanov Mladenov, MEng, PhD, Dept. of Internal Combustion Engines, tel.: 888 374
E-mail: mmladenov@ru.acad.bg.
Abstract:
This course is connected with the title of a diploma thesis and extends the knowledge received in "IC Engines in Transportation Vehicles" on the construction of diesel and gasoline fuel produced from different producers. The problems concerning project, diagnostics and repair of the fuel systems and their elements are included.
Course content:
IC Engines as a control object. Fuel injection systems in manifold (low pressure) and GDI (gasoline direct injection). Principle of operation of fuel injection systems. EC Unit. Diesel fuel injection system types. , type of governor and fuel system; calculation and modelling of the diesel fuel injection process. Structure, operation and components of currently used diesel engine fuel systems. Special attention is given to construction of distributor and in-line pumps made by Bosch and Lucas, as well as unit pumps and common rail systems. Diagnostics and self-diagnostics. Troubleshooting.
Teaching and assessment:
Modern books, publications, prospectuses and multimedia are used. During the course students individually carry out an investigation on structure, principles and performance of the specific model ICE. Workshops are directly connected to the Final project problems. Students' knowledge of the study material delivered at the lectures is tested during practical classes. Two topics are included in the examination procedure, one from each course part.

0625 Technical Diagnostics and Troubleshooting in Internal Combustion Engines (ICEs) (Troubleshooting and Service of ICEs)

ECTS credits: 2
Weekly workload: 3lec+0sem+0labs+0ps
Assessment: exam
Type of exam: oral
Department involved:
Departament of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Valentin Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 373
Abstract
The operation of the modern ICEs in optimum regime depends on the early diagnostics of fault and troubleshooting, as well as on the timely regulation and control of ICEs' parameters.
Course content:
Fundamental problems of the course are: forms of diagnostics, planning of preventive diagnostics, fault finding, economic aspects of diagnostics and troubleshooting, employment of different diagnostic parameters for determining the technical state, expert diagnostic systems.
Teaching and assessment:
Slides and transparences are employed as visual aids for the material taught. Problematic issues are put forward for discussion. Oral examination.

0434 Service of TM

ECTS credits: 5
Weekly workload: 6lec+0sem+0labs+3ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Pr. Assist. Prof. Aleksander Jordanov Stoianov, MEng, PhD, Dept. of Transport; tel.: 888-231,
E-mail: Astoianov@ru.acad.bg.
Abstract:
Studying the course the students will acquire detailed knowledge about the methods and technologies for diagnosis and technical maintenance of the basic systems of TM; the influence of the technical state of the separate systems on the work and the technical and economic parameters of the machines; the connection between the technical state and the alteration of the diagnostic parameters of the separate systems for diagnosis and development of systems and optimizing the process of diagnosing.
Course content:
Diagnostics of piston-cylinder group of EIC. Diagnostics of crank-crutch mechanism of EIC. Diagnostics and technical maintenance of air-supplier system and maintenance of fuel system of diesel and petrol (benzene) engine. Diagnostics and technical maintenance of ignition, electrical and brake system. Car tyre balance. Diagnostics of steering gear, suspension and chassis of TM. Determination of the standard values and the diagnostic parameters. Optimization of diagnosis of TM. Metrological bases of TM. Systems for diagnostics of TM.
Teaching and assessment:
Lectures are conducted in the classical way using slides, projectors and general drawings. Laboratory classes consolidate the material from the lectures with individual work on the part of the students. The grade is based on the knowledge demonstrated during the exam and the entrance control of Laboratory classes.

0627 Technical Resources for Diagnostics and Service

ECTS credits: 3
Weekly workload: 2lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Rosen Ivanov, MEng, PhD, Dept. of Automobiles, Tractors and Fork-Lift Trucks, tel: 082 888,
E-mail: rossen@ru.acad.bg;
Pr. Assist. Prof. Aleksander Jordanov Stoianov, MEng, PhD, Dept. of Transport; tel.: 888-231,
E-mail: Astoianov@ru.acad.bg.
Abstract:
Studying the course the students will acquire detailed knowledge of the working, functional possibilities, basic technical and economic characteristics, and metrological provision of the basic technical means for diagnostics and service.
Course content:
Metrological characteristics of the resources for diagnostics. Converters and basic functional elements in resources for diagnostics. Resources for diagnostics by power and fuel consumption, of piston-cylinder group and crankshaft of EIC. Resources for diagnostics and regulation of: electrical installation; fuel installation of diesel and petrol (benzene) engines, chassis, suspension, steering and brake gear; lighting and signaling installation. Electrical systems for multifunctional diagnostics of TM. Technical resources used in technical maintenance of TM.
Teaching and assessment:
The students acquire knowledge through lectures and practical classes, in which they analyze the mechanisms of the separate means for diagnostics and the technology to work with them.

0631 Organization and Management of Service

ECTS credits: 3 **Weekly workload:** 2lec+0sem+0labs+2ps
Assessment: exam **Type of exam:** written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Nikolai Iliev Kolev, MEng, PhD, Department of Transport, tel. 888 231,
E-mail: Nkolev@manuf.ru.acad.bg;
Pr. Assist. Prof. Aleksandar Iordanov Stoianov, MEng, PhD, Department of Transport, tel: 888 231,
E-mail: AStoianov@ecs.ru.acad.bg.
Abstract:
The purpose of the course is to give the students basic knowledge of engineering problems concerning the organization and management of service. Emphasis is put on: the organization of technological problems of technical service; diagnostics and operational repair on transport vehicles; organization of work at the working places; technological equipment; management of production processes; technological planning. The course is helpful for the graduate project and for the real practice.
Course content:
Service activity. Organization of technical service, diagnostics and repair. Management of service. Models. Strategic management. Quality management. Management of locomotives, carriages and ship maintenance.
Teaching and assessment:
The lectures give opportunities to the students to be acquainted with the general theory of organization of service. During practical classes technological and management solutions, founded on real information taken by visits, are developed. The mark is formed from the results of the exam and the aggregated mark from the practical classes.

0436 Application Software in Service Activity

ECTS credits: 2 **Weekly workload:** 0lec+0sem+0labs+3ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Departament of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Rosen Petrov Ivanov, Dept. ATC, tel. 888 528, E-mail: rosen@ru.acad.bg
Abstract:
The course aims at familiarizing the students with the main stages in the design and development of information systems (IS), their structure, organization and application. The course material is prepared for non-programmers. The specific electronic catalogues for spare parts in automotive machinery are considered in detail.
Course content:
Main problems of the IS. Life cycle of IS development using a structural approach. Structural analysis and design. Design and organization of IS user interface. IS management. Object-oriented (OO) analysis and design of IS. Web-based IS. Organization and methods for designing codes, classifiers and catalogues. Approaches for searching methods and storing the information in the catalogues.
Teaching and assessment:
The lecture topics give the main theoretic aspects of the problems considered and the practical aspects of application of IS. The workshops are conducted in a computer lab. The students should work independently with real electronic catalogues of the famous automobile producers. Visits in the service stations are organized, where the students work with real catalogues. The final mark is formed as an average of the workshop mark and of the examination mark from the test.

0626 Master thesis

ECTS credits: 15 **Weekly workload**: 0lec+0sem+0labs+0ps
Assessment: official defense **Type of exam**: oral
Department involved:
Department of Automobiles, Tractors & Fork-Lift Trucks and Department of Internal Combustion Engines and Department of Transport
Faculty of Automotive and Transport Engineering.
Consultants:
All lecturers from the Departments of Automobiles, Tractors & Fork-Lift Trucks, Internal Combustion Engines and Transport.
Abstract:
The Master thesis is an individual creative assignment, which is fulfilled under the leadership of a research lecturer and if necessary, under the leadership of a research consultant. Its objective is to give the opportunity to the students to show the accumulated knowledge and skills during their study for achieving the objectives and tasks of the Master thesis and to present their creative development successfully in front of an exam board.
Course content:
The Final Year Project contains: calculation explanatory note and graphical part
Teaching and assessment:
The profile Departments of Automobiles, Tractors & Fork-Lift Trucks, Internal Combustion Engines and Transport provide: the organization about collecting, confirming and announcing of theme suggestions for Master thesis; the distribution of themes and research leaders among the students; the diploma practice organization; the leadership, review and presentation of the Master thesis.
Weekly tutorials with the research leaders are envisaged for the students. Then the process of fulfillment of the given assignment is monitored.
The final year student presents the Master thesis in front of the State Examination Commission.

POSTGRADUATE STUDIES IN TRANSPORT MANAGEMENT AND TECHNOLOGY

PROFESSIONAL STANDARDS
OF A MASTER IN

TRANSPORT MANAGEMENT AND TECHNOLOGY

Course in **Transport Management and Technology**
Educational Degree - **Master**
Professional Qualification: **Master of Engineering**

Areas of Study: The Transport Management and Technology Academic programme prepares highly qualified Master of Engineering professionals in full compliance with the EU requirements as listed in Directive 89/43D/EIO

Professional Qualifications: MEng in Transport Management and Technology is designed for students who seek a comprehensive education in transportation and prepares professionals for scientific and practical work in the areas of systems theory, design and architecture, socio-technical enterprise systems and research methods, within a transportation framework.
Graduates with MEng Transport Management and Technology degree will complete the program possessing a high level of theoretical and practical understanding of existing air, rail, and highway transportation systems as well in-depth understanding in the areas of applied economics, finances, transportation insurance and organisation, marketing and management. Foreign language knowledge and understanding of the cultural peculiarities of doing business in a global setting are deeply inherent throughout the course of the program.

The academic program is built around the following cornerstones:

- Professional preparation – build upon the foundation of a completed Bachelor of Sciences degree in the areas of Automotive Engineering or Mechanical Engineering together with additional qualifying exams for a MEng degree.
- Specialised preparation – focuses on the intersection of studying transportation and manipulation quantitative methods, information technology, logistics, modelling and optimisation of the transportation processes, business and tax law, transportation marketplaces, rolling stock maintenance, licensing, civil and environmental engineering applications designed to accommodate students with a strong application interest in transportation.

Graduates with MEng Transport Management and Technology degree will be able to:

- Creatively apply their transportation knowledge and continuously update it according to the emergence of new transportation technologies and practices.
- Systematically approach and implement up-to-date methods and means to reach optimal solutions to complex transportation problems.
- Design optimal transportation-network processes and systems.
- Utilize the capabilities of information, communication and management systems within a transportation framework.
- Manage mass transportation systems from a business and logistical standpoint
- Responsibly manage transportation safety and uphold ecological standards.

Professional realisation for graduates with MEng in Transport Management and Technology will transcend industries and organizations, and can be applied to any type of transportation business setting that require comprehensive transportation optimization and financial analysis, including but not limited to the following: mass transport systems, logistical distribution centres, governmental transportation macro-management, scientific work in forming and testing transportation hypotheses, and academic work in the field of Transportation.

CURRICULUM

of the Master's degree course in

TRANSPORT MANAGEMENT AND TECHNOLOGY

Code	*First Semester*	*ECTS*	*Code*	*Second Semester*	*ECTS*
1166	Mathematical Modeling and Optimisation Methods in Transportation	5	1171	Traffic Engineering and Safety	4
1167	Transportation Systems, Technology and Logistics	5	1173	Information Systems and Communication in Transport	4
1169	Transportation Management and Marketing	5	1174	Transport Ecology	3
1170	Company Law and Tax Legislation	5	1175	Business Dynamics of the Transportation Process	4
1172	Economics and Financial Management	5	0318	Master thesis	15
	Elective Course:				
1168	Maintenance and Service of a Transportation Fleet	5			
1606	Repair and Utilization of Resources in Transport Machinery	5			
1607	Mathematical Modeling technology in service	5			
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Total Credits for the Program: 60 ECTS Credits

1166 Mathematical Modeling and Optimization Methods in Transportation

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: oral and written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc.Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, vpencheva@ecs.ru.acad.bg;
Pr. Assist. Prof. Asen Tsvetanov Asenov, MEng, PhD, Department of Transport, tel: 888 605,
E-mail: asasenov@ru.acad.bg;
Prof. Dimitar Georgiev Simeonov, MEng, PhD, Dep. Transport, tel.: 888 608,
E-mail: DSimeonov@ru.acad.bg.
Abstract:
The course Introduces the students to quantitative techniques of operation research with emphasis on applications in transportation systems analysis that will allow them to design multi-tier solutions to complex problems required for effective management of the transportation processes and systems.
Course contents:
The course syllabus includes unified study of functions of random variables, geometrical probability, multi-server queuing theory, spatial location theory, network analysis, and relevant methods of simulation. It utilizes knowledge of the Simplex method and its applications, as well two-tier problems and conditional vector theory, to generate algorithms for a variety of problems encountered in the domain of analysis and operation of transportation networks. Some topics are: Routing optimization for Truckload (TL) and Less-than-truckload (LTL) shipping within the framework of the Traveling Salesman problem. Game Theory. Mass transportation Theory.
Teaching and assessment:
Critical areas in this course are taught through a combination of lectures, cases, and class discussions in which the students deal with typical problems, as well as utilize modern flow optimization software packages in a computer lab setting. The final grade is awarded on the basis of a written case study exam and oral exam on fundamental linear optimization topics.

1167 Transportation Systems, Technology and Logistcs

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc.Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, vpencheva@ecs.ru.acad.bg;
Pr. Assist. Prof. Asen Tsvetanov Asenov, MEng, PhD, Department of Transport, tel: 888 605,
E-mail: asasenov@ru.acad.bg;
Prof. Dimitar Georgiev Simeonov, MEng, PhD, Dep. Transport, tel.: 888 608,
E-mail: DSimeonov@ru.acad.bg.
Abstract:
Introduction to freight theory and control with emphasis on supply chain management.
Course Contents:
Analysis of tradeoffs between transportation and inventory cost. Routing and scheduling with inventory considerations, distribution networks design and carrier networks design, optimization of carrier operations with emphasis on the different means of transportation and cargo-specific freight forwarding facilities. Examines in great detail the processes involved in freight-forwarding different types of cargo and designing of complex supply chains around different types of inventory.
Teaching and assessment:
Critical areas in this class are taught through a combination of lectures, cases, and class discussions in which the students design transportation networks within the framework of supply chains, to achieve optimization of the total process. The final grade is awarded on the basis of class participation and proven abilities to independently reach optimal performance of an integrated transportation-supply chain network.

1169 Transportation Management and Marketing

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc.Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, vpencheva@ecs.ru.acad.bg;
Pr. Assist. Prof. Asen Tsvetanov Asenov, MEng, PhD, Department of Transport, tel: 888 605,
E-mail: asasenov@ru.acad.bg.
Abstract:
Introduction to modern marketing and management theories in the area of Transportation.
Course Contents:
Current marketing trends. Product strategies including introduction, distribution and maintenance practices. Import/Export. International economic and transportation organizations. Transportation enterprises within the context of complex system management issues. Interdependence of economic and technological processes in management. Transportation enterprise strategies. HR Management within a transportation framework.
Teaching and assessment:
Traditional lecture and discussion format with wide utilization of multi-media technologies to facilitate the learning process. Lab exercises focus on solving problems using the Internet and Web-enabled services. The final grade is awarded on the basis of written final exam and overall class participation.

1172 Economics and Financial Management

ECTS credits: 5
Weekly workload: 2lec+0sem+0labs+2ps
Assessment: continuous assessment
Type of exam: written (test)
Department involved:
Departament of Business and Management
Faculty of Business and Management.
Lecturers:
Assoc. Prof. Alexander Petkov Petkov, PhD, Dept. of Business and Management, tel: 888 776;
E-mail: apetkov@ecs.ru.acad.bg.
Assoc. Prof. Georgi Batashki, PhD, Dept. of Business and Management, tel: 888 357;
Assoc. Prof. Jordanka Paseva Velcheva, PhD, Dept. of Business and Management, tel: 888 776;
E-mail: jvelcheva@ecs.ru.acad.bg
Abstract:
Improving the knowledge and practical skills in the area of economics and financial management of the companies are offered. During the study process the students will use knowledge of Management theory, Statistics, Information technologies, Forecasting and planning, Accounting and finance.
Students can use the knowledge from this module in further education, where financial plans and financial resource related decision making is required.
Course contents:
Management methods. Management of the company resources. Strategic management and planning. Investment and innovation. Human resource management. Control in organization. Modelling in management science. Discreet and probabilistic management models. Economic decisions and analysis. Risk and risk management. Simulation and risk analysis. International management. Basic characteristics of financial management. Special cash flows and rents. Capital management. Asset management. Cost management. Salary management. Revenue and cash flow management. Profit and effective management.
Teaching and assessment:
Teaching is by lectures and seminars. Lectures present the basic theory of financial management and the main methods for financial planning and analysis. During the seminars students will be solving various tasks and case studies, acquiring skills to make financial plans and analysis, to make decisions and work with business and financial information. The course finishes with a final written exam. The written exam counts for 60% of the final grade and participation of the seminars counts for 40%. The semester validation is required, according to “Internal Rules for Education” – Ruse University.

1170 Company Law and Tax Legislation

ECTS credits: 5
Weekly workload: 1lec+1sem+0labs+0ps
Assessment: continuous assessment
Type of exam: written and oral
Department involved:
Departament of Public Law
Faculty of Law.
Lecturers:
Prof. Lychezar Ivanov Dachev, Dept. of Public Law, tel: 888 721;
Assis. Prof. Ivaylo Todorov Ivanov, Dept. of Public Law, tel: 888 721.
Abstract:
The course aims at familiarizing the students with the main aspects of Company Law, the physical and juridical persons who qualify as traders under the Commercial Law, with the concept of commercial enterprise, types of trading partnerships, emergence and development of commercial relations. The course deals with fundamental questions of tax law and duty taxation issues in transport operations.
Course content:
The notion of trader and qualifying as a trader. Commercial enterprise and representation office. Public state takings. Taxation of duties and duty regime in the People's Republic of Bulgaria. Customs control. Customs conventions and international customs documentation.
Teaching and assessment:
The topics delivered at lectures are elaborated on at the seminars through the provision of specific examples from law and customs practice. Final assessment is based on student performance during the semester and the demonstration of self-study skills.

1168 Maintenance and Service of a Transportation Fleet

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Deprtment of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc.Prof. Daniel Bekana, MEng, PhD, Department of Repair, Reliability and Chemical Technologies,
tel: 888 701, dbekana@ru.acad.bg;
Pr. Assist. Prof. Aleksandar Stoianov, MEng, PhD, Department of Transport, tel.888 231,
E-mail: AStoyanov@ru.acad.bg.
Abstract:
In this course named "Maintenance and service of a Transportation Fleet" students will learn the main activities, strategy, structure and organisation of maintenance within firms that are involved in transportation and similar activities to allow transportation machines to perform their normal duty in the given normative documentation of the EU (Transport Detectives). The life cycle of transportation machines will also be regarded. The aim of laboratory practicals is to teach the students how to use modern methods and strategies of maintenance of transportation machines as well as diagnose their technical condition and evaluate the efficiency of maintenance methods.
Course contents:
Introduces maintenance, its history and context; covers management theory, principles and techniques. Mechanics of failure is analyzed. Maintenance management of transportation machines. Life cycle analysis of transportation machines. Identification of the main systems, which are important for the successful operation of maintenance management of transportation machine programme, and the main problems that limit the effectiveness of such systems. Modern understanding of maintenance. Transition from reactive to reliability centered maintenance. Total productive maintenance of transportation machines.
Teaching and assessment:
The lectures will be conducted in a traditional method, by using multimedia projector and PS, and handouts of the lectures. The lab classes are connected with the lectures and are conducted in the laboratories of the department. It is compulsory to attend laboratory practicals. The titles of the lectures and the laboratory classes will be announced at the beginning of the semester. The criteria for completing the course are in compliance with the regulation of the University. The knowledge that is gained from this course is evaluated by examination and activities of the student shown during laboratory classes.

1606 Repair and Utilization of Resources in Transport Machinery

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Vasil Antonov Stoyanov, MEng, PhD, Department of Repair, Reliability and Chemical Technologies, tel. 888 480, E-mail: VAS@ru.acad.bg;
Pr. Assist. Prof. Aleksandar Yordanov Stoyanov, MEng, PhD, Department of Transport, tel.888 231,
E-mail: AStoyanov@ru.acad.bg.
Abstract:
The course Repair and Utilization of Resources in Transport Machinery is optional for students OKM Master degree programme TUT. The aim of this course is to provide theoretical and applied knowledge relating to technology and practices in recovery and working resource transport equipment (ships, locomotives, tractors, cars, etc.). Laboratory classes are related to scientific and practical application of scientific methods and technology transfer in lectures.
Course content:
Current problems in the use and utilization of transport equipment, technical and environmental efficiency of extending the life of TT; Increasing wear parts and compounds in repair and maintenance of transport vehicles; Recovery and increased antifriction surfaces of the units and details of TM, Application of Plasticity for the recovery of parts, applications navarachnite, welding and metalizatsionni methods in repair and maintenance of the units, units and parts; Technology Resource Recovery of standard detail of TT.
Teaching and assessment:
The lectures are conducted in the classical scheme, as theoretically the main content of the subjects using slides, transparencies and Projection. The laboratory classes include strengthening of the material from the lectures through work on real objects stands and equipment. The final assessment is formed after the written exam.

1607 Mathematical Modeling Technology in Service

ECTS credits: 5
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Nikolai Iliev Kolev, MEng, PhD, tel: 888-825, E-mail: Nikolev@ru.acad.bg;
Pr. Assist. Prof. Alexander Jordanov Stoyanov, MEng, PhD, Dept.of Transport, tel. 888 231,
E-mail: AStoyanov@ru.acad.bg
Abstract:
Studying the course Modeling Technology in Service the students will learn about the development and creation of a rational structure of production and management workshops, improving the scientific level in planning work, optimization of the decisions on the basis of modern economy-mathematical methods. Knowledge on the subject is given by lectures. Laboratory classes enhance the material from the lectures through training the students on real objects and models, with particular attention being paid to teaching students to summarize, analyze and reflect on the results.
Course content:
Nature and importance of system analysis and its role in the management, operation of companies and service of automotive transport systems; criteria for effective functioning of automotive companies and workshops; Input parameters of systems maintenance and repair of automobiles; Characteristics of the state of technical systems service and repair; Analytical modeling of manufacturing processes, optimization of production processes, maintenance, modeling organization of repair and production programmes of ongoing maintenance and repair of automobiles.
Teaching and assessment:
The lectures are conducted in the classical mode, as theoretical presentation of the main content of individual topics and relationships in the general theory of the course, using slides, transparencies and powerpoint presentations. The laboratory classes include consolidation of the material from the lectures through individual work of students on models and real object stands located in the owrkshop. The final assessment is formed after the written exam.

1171 Traffic Engineering and Safety

ECTS credits: 4
Weekly workload: 4lec+0sem+3labs+0ps
Assessment: exam
Type of exam: oral and written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Pr. Assist. Prof. Jivko Gelkov, MEng, tel: 888-609, E-mail: JGelkov@ecs.ru.acad.bg.
Abstract:
The aim of the course is to teach the students the type, structure and functions of the systems for Traffic Engineering and Safety through the methods of the systematical approach. The students study the principles and the mechanisms for assessment of the functioning of the systems for traffic engineering and safety. Input relations to: Traffic Safety, Traffic Engineering and Control of Transportation, Transport Infrastructure, Theory of Traffic Flow and Logistics.
Course contents:
Systematic and methodical approach. Structure and types of the systems for traffic engineering and safety (STES). Principles for analysis and synthesis of STES. Technical, administrative, law and mixed STES. Effects of the human factor on STES.
Teaching and assessment:
Lectures are taught in a traditional way. Appropriate technical equipment is used for training. Some key problems in the area of study are discussed. The students visit an airport, a seaport and a railway station. The final grade is awarded on the basis of a written case study exam and oral exam.

1173 Information Systems and Communication in Transport

ECTS credits: 4
Weekly workload: 4lec+0sem+3labs+0ps
Assessment: exam
Type of exam: oral and written
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Mitko Marinov, MEng, PhD, tel: 888-609, E-mail: mdmarinov@manuf.ru.acad.bg.
Pr. Assist. Prof. Jivko Gelkov, MEng, tel: 888-609, E-mail: JGelkov@ru.acad.bg.
Abstract:
The course consists of two main modules, which discuss the problems of communications in transport and modern information systems and their application in transport. Means (devices) for transmission of data, technologies for receiving (Internet technologies) and information storage (database) are analyzed and classified. The purpose of the systems and their possibility to secure safe and effective use of different types of transport is stressed.
Course contents:
Module 1. Basic theories and devices for transmission of data. Networks with commutation of channels. Global networks and intercomputer communication. Satellite systems for mobile communication. Specialized networks for transport needs.
Module 2. Application of information technologies in transport. Systems for location and navigation of transport means. Systems and devices for traffic safety. Systems and devices for information and security in transport. Modern information technologies for services in transport.
Teaching and assessment:
Lectures are taught in a traditional way. Appropriate technical equipment is used for training. Some key problems are discussed in the area of study. The laboratory classes illustrate the lectures by means of computer simulation packages. Internet is used to demonstrate the work of real operation devices and systems in transport. The final grade is awarded on the basis of a written case study exam and oral exam.

1174 Transport Ecology

ECTS credits: 3
Weekly workload: 3lec+0sem+3labs+0ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Kiril Barzev, MEng, PhD, tel: 888-432, E-mail: barzev@ru.acad.bg;
Pr. Assist. Prof. Emilian Petrov Stankov, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 332,
E-mail: estankov@ru.acad.bg.
Anotation:
The course develops further the students' knowledge about the ecological problems of transport mentioned briefly in the bachelor degree programme and adds new aspects concerning internal combustion engine conversion for working with alternative fuels. The students build up a system of knowledge about the ecological and economic estimation of vehicles using alternative fuels. It is necessary to deepen the knowledge of ongoing processes into internal combustion engines as well as the basic knowledge in chemistry and general ecology.
Course contents:
Energy sources. Conversion of spark-ignition and compression-ignition engines to work with alternative fuels. Ecological and fuel consumption efficiency estimation after conversion. Measurement and legislation of internal combustion engine toxic exhaust emissions. Requirements and procedures of exhaust emissions measurement for new and used vehicles. Current and advanced concepts for exhaust emissions reduction of spark-ignition and compression-ignition engine.
Teaching and assessment:
The concepts delivered about energy sources, exhaust emissions measurement and estimation of the vehicle's ecological and fuel consumption efficiency are taught through laboratory classes. The students knowledge is evaluated by continuous assessment, which is obtained from a minimum of two tests during the semester.

1175 Business Dynamics of the Transportation Process

ECTS credits: 4
Weekly workload: 4lec+0sem+3labs+0ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc.Prof. Velizara Pencheva, MEng, PhD, tel: 888-825, vpencheva@ecs.ru.acad.bg;
Pr. Assist. Prof. Asen Tsvetanov Asenov, MEng, PhD, Department of Transport, tel.: 888 605,
E-mail: asasenov@ru.acad.bg.
Prof. Dimitar Georgiev Simeonov, MEng, PhD, Dep. Transport, tel.: 888 608,
E-mail: DSimeonov@ru.acad.bg.
Abstract:
The course provides in-depth knowledge of the practice of analyzing and managing of the relationship between financial and transportation management and the various functions of business. More specifically, the course deals with problems involving international freight markets, transportation requirements for doing business, and overall freight-forwarding system organization.
Course Contents:
The course analyzes the transportation services marketplace, and the international freight market. It focuses on international business and transportation requirements for doing business internationally and examines the impact of international transportation agreements, and Bulgaria's involvement with world-wide standards setting legislative bodies. It provides an overview of the transportation licensing requirements in Bulgaria and also looks in detail into the various types of freight and transportation insurance options. Survey of information technology covering data exchange within transportation framework is offered.
Teaching and assessment:
Traditional lecture and discussion format with wide utilization of multi-media technologies to facilitate the learning process. Wide use of case studies that are followed by class discussions on the practical applications of the topics discussed in class. The lab classes focus on solving problems using the Internet and Web-enabled services. The final grade is awarded on the basis of a written final exam and overall class participation.

0318 Master Thesis

ECTS credits: 15
Weekly workload: 0lec+0sem+0labs+0ps
Assessment: official defense
Type of exam: oral
Department involved:
Department of Transport
Faculty of Automotive and Transport Engineering.
Consultants:
All lecturers from the Department of Transport.
Abstract:
The Final Year Project is an independent creative assignment, which is fulfilled under the supervision of a research lecturer and if necessary, under the leadership of a research consultant. Its objective is to give the students the opportunity to show the knowledge and skills accumulated during their study for achieving the objectives and tasks of the Master thesis and to present their creative development successfully in front of an exam board.
Course content:
The Master thesis includes calculations-based explanatory note and graphical part
Teaching and assessment:
The specialists of the Department of Transport are responsible for collecting, confirming and announcing the topic suggestions for Master thesis; the distribution of themes and research leaders among the students; the diploma practice organization; the leadership, review and presentation of the Master thesis.
Weekly tutorials with the research leaders are envisaged for the students. Then the process of the fulfillment of the given assignment is monitored.
The final year student presents the Master thesis in front of the State examination board.

POSTGRADUATE STUDIES IN INVESTIGATION OF INTERNAL COMBUSTION ENGINES

PROFESSIONAL STANDARDS
OF A MASTER IN

INVESTIGATION OF INTERNAL COMBUSTION ENGINES

SUBJECT **Investigation of Internal Combustion Engines**
Educational Degree - **Master**
Professional Qualification: **Master of Engineering**
Term of education: **1 year (2 terms)**

Aims: The main aim of the **Investigation of Internal Combustion Engines** degree course is to educate and train highly-qualified masters of engineering in various fields – testing, manufacture and operation of Internal Combustion Engines.

The professional suitability of a Master of Engineering in **Investigation of Internal Combustion Engines** is to do research, perform introductory, operational, manufacturing, technological, managerial and servicing activities in the field of internal combustion engines and transport vehicles.

The Master of Engineering in **Investigation of Internal Combustion Engines** must be highly-qualified and have wide linguistic competence and knowledge of modern methods and tools for design, optimization of ICE systems and their characteristics, of the automated stands for investigation, processing of experimental data and optimal knowledge of management.

His/her training must be based on:

- **complex training** including the study of engineering software, methods for optimization and mathematical processing of data, modern tools for investigation and control of ICEs.
- **specialised training** including the study of energy sources and fuel systems, alternative engines, electronic systems for monitoring, investigation and control of harmful emissions, diagnostics and maintenance of breakdowns and failures, modeling and optimization of the modes and CAD/CAM systems and investigation of ICEs.

Job opportunities:
Nationally: researchers, managers of company representation offices, laboratories for the certification of ICEs and TVs, operation and maintenance of TVs.

Abroad: in any transport company in the capacity of engineer-researchers, ICE calibrating experts, project managers and service managers.

CURRICULUM

of the Master's degree course in

INVESTIGATION OF INTERNAL COMBUSTION ENGINES

Code	*First Semester*	*ECTS*
1421	Software for Engineers	6
1422	Energy Sources and Fuel Systems	6
1423	Methods and Equipment for ICEngines Investigation and Control	6
1424	Alternative Engines	6
1431	Study and Control of Exhaust Emissions	6
	Total Credits for the semester:	***30***

Code	*Second Semester*	*ECTS*
1427	Control System	4
1432	Diagnostics and Troubleshooting	2
1433	Modeling and Optimization of Modes	3
1434	Automated Systems for Design and Manufacture of Internal Combustion Engines	4
	Elective course:	
0791	ICE Investigation Stands	2
0953	Testing of Fuel and Ignition Systems of ICEs	2
0955	Investigation of Engine Power, Fuel Economy and Exhaust Emissions Performance	2
0956	Theoretical Investigation of Gas Exchange Process and Combustion in ICEs	2
0957	Master thesis	15
	Total Credits for the semester:	***30***

Total Credits for the Program: 60 ECTS Credits

1421 Software for Engineers

ECTS credits: 6
Weekly workload: 2lec+0sem+0labs+3ps
Assessment: exam
Type of exam: written
Department involved:
Departament of Informatics and Information Technologies
Faculty of Natural Sciences and Education.
Lecturers:
Assoc. Prof. Margarita Teodosieva, MEng, PhD, Dept. of Informatics and Information Technologies,
tel: 888 464, E-mail: mst@ami.ru.acad.bg.
Abstract:
The purpose of this course is to introduce the fundamental principles of computer application in practice. The students will gain knowledge and skills in:

- creating and implementing information systems in the area of their activities;
- preparing presentations for conferences, science and practical workshops etc.;
- arranging reports, papers, advertisement materials and other documents;
- producing their personal Web pages.

Course content:
Introduction to Office 2000. DBMS, organisation and implementation of databases, query management, optimisation and execution. Analysis of relational schemes. Normal forms. Normalization. Database applications Access 2000 - design and creation of databases. Design and implementation of databases and information systems within Access 2000 environment. Advanced features of Windows 2000, Word 2000 и Excel 2000. Web page development within FrontPage 2000. Presentation design using PowerPoint 2000.
Teaching and assessment:
The course comprises lectures and workshops.
The lectures introduce the students to the topic. Some details are discussed and suitable examples are given.
Within workshop sessions the students are grouped in teams. Each team develops their own example of database, presentation and Web page. The development progresses weekly according to the syllabus.
Practical skills are assessed continuously through review of documents, presentations and software produced by the students.
During the semester the students do 2 tests on the lecture topics.

1422 Energy Sources and Fuel Systems

ECTS credits: 6
Weekly workload: 3lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Kiril Barzev, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 432,
E-mail: barzev@ice.ru.acad.bg;
Assoc. Prof. Mladen Bogdanov Mladenov, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 374,
E-mail: mmladenov@ecs.ru.acad.bg.
Abstract:
The subject develops knowledge about different energy sources and requirements connected with them. The students study how to convert internal combustion engines for working with alternative fuels. The students build up a system of knowledge about the vehicles' ecological and economy estimation when using alternative fuels. Profound knowledge of ongoing processes in internal combustion engines, as well as basic knowledge in chemistry and general ecology is necessary.
Course contents:
Energy sources. Conventional and alternative fuel characteristics. Conversion of spark-ignition and compression-ignition engines to work with alternative fuels. Alternative fuels infrastructure. Engine performance, fuel efficiency and exhaust emissions estimation after conversion. Hybrid vehicles. Gasoline and diesel engines advanced fuelling systems.
Teaching and assessment:
The delivered concepts about energy sources, spark-ignition and compression-ignition engines conversion for alternative fuels as well as the estimation of ecological and fuel consumption efficiency are taught through laboratory classes. The test is written. The score is finalized after an interview with the student.

1423 Methods and Equipment for IC Engines Investigation and Control

ECTS credits: 6
Weekly workload: 3lec+0sem+2labs+0ps
Assessment: exam
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Valentin Ivanov, MEng, PhD, ICE Dept, tel: 888 373;
Assoc. Prof. Atanas Iliev, MEng, PhD, ICE Dept, tel: 888 272, E-mail: ailiev@ru.acad.bg.
Abstract:
Students are acquainted with methods of measurement of different values, characteristics of sensors and actuators, elements of the theory of probability and design of experiment.
Course content:
Measurements. Sensors and actuators. Transmission of information from sensors. Theory of probability. Design of experiment. Solving of optimization task with limitations.
Teaching and assessment:
The multimedia is used at lectures, where students receive the essential information. Every practical class finishes with an individual report. The final mark is formed on the basis of the results from the whole semester.

1424 Alternative Engines

ECTS credits: 6
Weekly workload: 3lec+0sem+0labs+2ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Department Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Hristo Stanchev, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 373,
E-mail: hstanchev@ru.acad.bg.
Assoc. Prof. Stancho Angelov Stanchev, MEng, PhD, Department of Internal Combustion Engines,
tel.: 888 331
Abstract:
The course covers the different types of compound engines, theory and design of compressors, turbines and turbochargers. Subjects of study are also the theory and design of gas turbine engines, basic operation and special features of rotary-piston engines and Stirling engines. The course is based on the profound fundamental knowledge in thermodynamics, fluid mechanics, hydro and pneumatic drives and internal combustion engines. The knowledge obtained can be applied for graduation paper development and in engineering practice.
Course contents:
Drawings and operation for different types of compound engines. Special features of working cycles for compression and spark ignition compound engines. Transient conditions of compound engines. Optimal performance of compound engines and methods for its obtaining. Turbocharging process government. Thermal loading and power restriction of compound engines. Compressors. Gas turbines. Turbochargers. Gas turbine engines. Cycles of gas-turbine engines. Combustion and combustion chambers of gas-turbine engines. Fuel supply systems and automatic government of gas turbine engines. Performances of gas-turbine engines. Rotary-piston engines and Stirling engines.
Teaching and assessment:
The lectures are presented with the help of posters and multimedia. All the lectures have logical sequence and every lecture starts with preliminary control of student training. During the practical classes the teaching is carried out using models, posters and multimedia. Every laboratory class starts with preliminary control of student training. At the end of the semester the students submit an overall test paper. Based on the final results of the test paper and the overall training behavior the students are given the final mark. If the mark is not satisfying, the student takes correctional examination. This exam is in writing. The final mark is granted after a talk with the student.

1431 Study and Control of Exhaust Emissions

ECTS credits: 6
Weekly workload: 2lec+2sem+0labs+0ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Emil Marinov Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 331,
E-mail: EMarinov@ru.acad.bg;
Prof. Kiril Barzev, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 432,
E-mail: barzev@ice.ru.acad.bg.
Abstract:
The course develops further the students' knowledge about the ecological problems of transport mentioned briefly in the bachelor degree programme and adds new aspects related to measurement, lisencing and control of the engine's exhaust emissions. The students study procedures to investigate and evaluate the vehicle's ecological parameters. It is necessary to deepen the knowledge on ongoing combustion processes into internal combustion engines, as well as the basic knowledge in chemistry, general ecology and physics.
Course contents:
Emission measurement and gas analysis basics. Measurement cycles for vehicle and engine regulation requirements. Factors influencing spark-ignition and compression-ignition engine emissions. Determination of air-fuel mixture composition by exhaust gas composition. Vehicle noise and vibration measurement and control. Current and future vehicles exhaust emissions standards. Advanced exhaust emissions control systems for spark-ignition and compression-ignition engine.
Teaching and assessment:
The concepts delivered about the investigation, measurement and control of exhaust emissions, noise and vibrations are taught through practical classes. The test is written. The score is finalized after an interview with the student.

1427 Control Systems

ECTS credits: 4
Weekly workload: 4lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Valentin Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel. 888 373.
Abstract
The course acquaints the students with the foundation, structure and ideology of the creation of electronic control systems of automotive engines and automobiles. A prerequisite for successful study of the course is the fundamental knowledge of the theory of internal combustion engines (ICEs), Electrical parts and electric measuring, Testing and research of ICEs, Electric and electronic equipment of automobiles and tractors. The course helps the acquisition of knowledge and skills about the maintenance of automobiles and automotive engines and the elimination of their troubles.
Course contents:
Petrol engines as an object of automatic regulation. Diesel engines as an object of automatic regulation. Architecture of computer control systems. Electronic control systems of automotive engines. Electronic control systems of automobiles.
Teaching and assessment:
Slides and transparencies are employed as visual aids for the matirial presented. Problem issues are put forward for discussion. There is a check exercise on each topic. On regular attendance at the lectures and a positive average mark from all the check tests the students are exempt from examination. The mark is formed after an interview with the student.

1432 Diagnostics and Troubleshooting

ECTS credits: 2
Weekly workload: 3lec+0sem+0labs+1ps
Assessment: continuous assessment
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Valentin Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 373
Assoc. Prof. Hristo Stanchev, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 373,
E-mail: hstanchev@ru.acad.bg.
Abstract:
The reliability of modern ICEs depends on the early diagnostics and troubleshooting and the timely adjustment and control of their parameters.
Course content:
Different kinds of diagnostics. Planning of preventive diagnostics. Definition of malfunctions. Economic aspects of diagnostics and troubleshooting. Use of different diagnostic parameters for estimating the state of the engine. Expert systems for diagnostics.
Teaching and assessment:
Slides and transparencies are used in the lectures to illustrate the material taught. Problems are brought up for dicussion. Evaluation is in the form of continuous assessment. The final grade is formed after an interview with the student.

1433 Modeling and Optimization of Modes

ECTS credits: 3
Weekly workload: 4lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Atanas Iliev, MEng, PhD, ICE Dept, tel: 888 272, E-mail: ailiev@ru.acad.bg.
Assoc. Prof. Hristo Stanchev, MEng, PhD, ICE Dept., tel.: 888 373, E-mail: hstanchev@ru.acad.bg
Abstract:
The course includes modeling of ICE working processes, emission formation and methods for determining the optimal laws of control (mapping) of ICEs.
Course content:
Modeling of ICEngines. Introduction. Modeling of gas exchange processes. Combustion modeling. Induction systems tuning. Emission modeling. Electronic control systems. Optimal laws for ignition and injection control systems. Adaptive control systems.
Teaching and assessment:
Multimedia is used in the lectures. The main cores of lectures are written materials and recent publications. The assessment is on the basis of continuous control and the mark is from the final written examination.

1434 Automated Systems for Design and Manufacture of Internal Combustion Engines

ECTS credits: 4
Weekly workload: 4lec+0sem+0labs+2ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Emil Marinov Ivanov, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 311,
E-mail: EMarinov@ru.acad.bg
Assoc. Prof. Atanas Lyubenov Iliev, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 833,
E-mail: ailiev@ru.acad.bg
Abstract:
The course deals with fundamental issues of system design and automation of engineering in designing, calculating and manufacturing internal combustion engines. It requires knowledge of design and calculation of internal combustion engines, knowledge of testing and investigation of ICEs. It summarizes knowledge from other subjects and is the basis for engineering practice.
Course content:
Systems for design of ICEs. Modelling of systems for ICEs. Designing of family ICEs. Optimization of ICE parameters. Automated systems for design of ICEs. Automated systems for manufacture and testing of ICEs.
Teaching and assessment:
Lectures familiarize the students with automated design, manufacture and testing of ICEs. Laborary classes enable the students to assimilate theoretical knowledge gained at lectures through the use of computer software. Course work deals with a specific example. Two tests are administered during the semester. The exam is written. Final assessment is based on test results followed by a conversation with the student.

0791 ICE Investigation Stands

ECTS credits: 2
Weekly workload: 3lec+0sem+0labs+1ps
Assessment: exam
Type of exam: written and oral
Department involved:
Departament of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Atanas Iliev, MEng, PhD, Department of Internal Combustion Engines, tel: 888-833; 888-272,
E-mail: ailiev@ru.acad.bg.
Abstract:
The subject is the final one to be studied on the master's degree course and is elected among four alternatives, depending on the topic of the diploma paper. The **ICE Investigation Stands** course builds on the knowledge of methods and tools for testing and investigation of internal combustion engines and provides a detailed study of stands and equipment used in investigating ICEs for the purpose of establishing their characteristics and optimal adjustment parameters both in their production and operation.
Course content:
Introduction. Stand and testing device requirements for testing and investigation of ICEs. Dynamometers – structure and operating principles. Mounting requirements. Fuel injection systems. Air injection systems. System requirements. Structure. Measuring air consumption. Engine cooling system. Exhaust system. Fundamentals of stand design for investigating ICEs. Automated stands for investigation of ICEs. One-cylinder engine stand for research and development. Equipment for developing and adapting electronic systems for governing of petrol engines.
Teaching and assessment:
Lectures are visualized with the help of posters and slides. Each lecture is preceded by a summary of the previous one and linked to the new one. Each laboratory class starts with an entry test. Experimental data are processed and reports written and discussed in class. Final assessment is based on a written exam.

0953 Testing of Fuel and Ignition Systems of ICEs

ESTC credits: 2
Weekly workload: 3lec+0sem+0labs+1ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of ICE
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Mladen Bogdanov Mladenov, MEng, PhD, Dept. of ICE, Tel: 888 374,
E-mail: mmladenov@ecs.ru.acad.bg, mlbmladenov@abv.bg.
Abstract:
The course presents knowledge and methods necessary for testing of fuel injection and ignition systems of Internal Combustion Engines. All kinds of fuel systems and ignition systems currently in use in Bulgaria are studied in details. Students are required to have attended the courses in Theory of Internal Combustion Engines, Fuel Systems and Automatic Drive of Internal Combustion Engines, and Electrical Systems of ICE. The course is basic for the preparation of final (diploma) thesis and for engineering practice.
Course contents:
The course includes information about the wide range of fuel injection and ignition systems in use on European and Japanese currently produced car engines. It contains two parts – the first one on fuel systems and the second on electrical systems. For each part necessary equipment and general test procedures are presented. Structure, operation and components of every system both fuel and electrical are described briefly. The following procedures are given for selected car engines: system adjustment, component checks and adjustment and system trouble shooting.
Teaching and assessment:
Student knowledge of the study material delivered at the lectures is tested during training and classes. Two topics are included in the examination procedure, one of each course part.

0955 Investigation of Engine Power, Fuel Economy and Exhaust Emissions Performance

ECTS credits: 2
Weekly workload: 6lec+0sem+0labs+6ps
Assessment: exam
Type of exam: oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Kiril Barzev, MEng, PhD, Dept. of Internal Combustion Engines, tel: 888 432,
E-mail: barzev@ice.ru.acad.bg.
Abstract:
This course is the last one from the master curriculum and it is chosen among four courses depending on the diploma thesis topic. Students study methods of engine performance, fuel economy and exhaust emissions estimation and their correction depending on atmospheric conditions. Emphasis is also made on the factors (constructive, control and running) influencing the main engine characteristics. Profound knowledge of the theory of internal combustion engines, investigation of internal combustion engines, as well as of basic chemical reactions is necessary.
Course contents:
Power, fuel consumption and exhaust gases composition measurement under steady and transient engine state. Study of the influence of design, control and running factors on the engine performance, fuel economy and exhaust emissions. Advanced internal combustion engines and their performance. Ways for optimization of engine design, control and running factors in order to obtain optimal engine characteristics.
Teaching and assessment:
During the practical exercises students acquire the methods of approach on power, fuel consumption and exhaust gases components measurement and correction. By using modern measuring apparatuses students are gaining experience to apply their knowledge in estimating engine performance, fuel consumption and exhaust emissions. The test is written. The score is finalized after an interview with the student.

0956 Theoretical Investigation of Gas Exchange Process and Combustion in Internal Combustion Engines

ECTS credits: 2
Weekly workload: 3lec+0sem+0labs+1ps
Assessment: exam
Type of exam: written and oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Emil Ivanov Marinov, MEng, PhD, Department of Internal Combustion Engines,
tel: 888 331, E-mail: EMarinov@ru.acad.bg.
Abstract:
The course is studied at the end of the Master degree programme and the students can choose it among the four suggested courses with the same subject area according to the topic of their diploma thesis.
The course in Theoretical Investigation of Gas Exchange Process and Combustion in Internal Combustion Engines, provides knowledge in the field of investigation of combustion, possibilities for its modeling and management. The course requires profound fundamental knowledge in Thermodynamics, Gas Dynamics, Hydraulics, Dynamics and Design of Mechanisms and CFD.
Course contents:
Combustion and gas exchange processes in spark ignition and compression ignition four- and two-stroke engines. Resonance induction and exhaust. Exhaust gas recirculation. Gas exchange process in turbocharged engines. Modeling and investigation of gas exchange process. Systems and mechanisms of gas exchange process implementation.
Teaching and assessment:
The lectures are presented with the help of posters and multimedia. All the lectures have logical sequence. Every laboratory exercise starts with preliminary control of the student training. The test results are analyzed during the laboratory exercises. The exam is in writing.

0957 Master thesis

ECTS credits: 15
Weekly workload: 0lec+0sem+0labs+0ps
Assessment: official defense
Type of exam: oral
Department involved:
Department of Internal Combustion Engines
Faculty of Automotive and Transport Engineering.
Consultants:
All lecturers from the Department: Internal Combustion Engines.
Abstract:
The Master thesis is an individual creative assignment, which is fulfilled under the leadership of a research lecturer and if necessary, under the leadership of a research consultant. Its objective is to give the opportunity to the students to show the accumulated knowledge and skills during their study for achieving the objectives and tasks of the Master thesis and to present their creative development successfully in front of an exam board.
Course content:
The Final Year Project contains: calculation, explanatory note and graphical part
Teaching and assessment:
The profile Department of Internal Combustion Engines provide: the organisation about collecting, confirming and announcing of theme suggestions for Master thesis; the distribution of themes and research leaders to the students; the diploma practice organization; the leadership, review and presentation of the Master thesis.
Weekly tutorials with the research leaders are envisaged for the students. Then the process of fulfillment of the given assignment is monitored.
The final year student presents the Master thesis in front of the State Examination Commission.

POSTGRADUATE STUDIES IN AUTOMATED DESIGN OF TRANSPORT AND PRODUCTION MACHINERY

PROFESSIONAL STANDARDS
OF A MASTER IN

AUTOMATED DESIGN OF TRANSPORT AND PRODUCTION MACHINERY

Degree programme **Automated design of Transport and Production Machinery**
Educational Degree - **Master**
Professional Qualification: **Master of Engineering**
Term of education: **1 year (2 semesters)**

Major goal of the education of the master course **Automated design of Transport and Production Machinery** is to prepare the master - engineer with high professional qualification in the field of design using modern technology, facilitating the abilities of the existing CAD-systems.

The professional qualification of the engineers is to work as skilled workers in firms, designing, repair and logistics, using CAD systems.

The Master – engineer should have good training, language skills, and knowledge of the modern methods and techniques for design and optimization of transport machines and machine tools.

- **Complex training**. Knowledge of the following basic areas is provided: General principles and methods for design; Methods for strength, deformational, dynamics and accuracy calculations of structures.
- **Specialized training**. Methods for design of basic types of machines for the manufacturing and transportation, adaptation to the possibilities of the modern CAD-systems, like AutoCAD SolidWorks and its add-ons like Mechanical Desktop etc.

Work opportunities
The master degree course Automated Design of Transportation and Machine Tools provides qualification for work in firms dealing with design, manufacturing, research and development, consulting, trade and certification. The graduates could work as chiefs of design teams, designers, experts, researchers and consultants, as well as organizers of internal transportation.

CURRICULUM

of the Master's degree course in

AUTOMATED DESIGN OF TRANSPORT AND PRODUCTION MACHINERY

Code	*First Semester*	*ECTS*	*Code*	*Second Semester*	*ECTS*
1880	Engineering Construction	5	1885	Design and Optimization of Gear Drives and Speed Reducers	4
1881	Dynamics of Machines and Structures	5	1886	Drive Systems	3
1887	Automatic Development of Design Documentation	5	1888	Automated Systems for Machine Design	4
1884	Precision Measurement, Manufacturability and Quality of Mechanical Structures	5		***Elective Course:***	
1883	Design of Transport Means	5	1889	Materials Handling Equipment	4
1882	Structure Calculations by Finite Element Method	5	1890	Materials Handling Engineering	4
			1892	Optimal Design of Mechanical Systems	4
			1893	Analysis and Design of Systems	4
			1896	Master thesis	15
	Total Credits for the semester:	***30***		***Total Credits for the semester:***	***30***

Total Credits for the Program: 60 ECTS Credits

1880 Engineering Construction

ECTS credits: 5 **Weekly classes**: 2lec+0sem+0labs+2ps
Assessment: continuous assessment **Type of exam**: written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Ivan Georgiev Spasov, MEng, PhD, Dept. of Machine Science and Machine Elements,
Tel: 888 235, E-mail: igs@ru.acad.bg
Abstract:
The course familiarizes the students with the main topics in the field of engineering, connected with contemporary methods by means of accumulation, cultivation and preservation of information spates for preparation of a succession of procedures of engineering construction. Students acquire abilities to improve and rationalise construction sketches, as well as technological, ergonomic, aesthetic and economic indices of technical objects. The course Engineering Construction creates a methodological base to construction of machines and equipment in this and other courses.
Course content:
Essence of construction. Methodology of construction. Systematic approach to of construction and information insurance. Analysis of constructions and synthesis of decision with conventional approach and creating of new technical objects. Morphology conformable with ergonomics and aesthetics requirements. Optimisaction and evaluation of achievement.
Teaching and assessment:
The lectures give a logical presentation of the material supported by examples and models of moving mechanisms machine elements, demonstrated by a projector. The lecture topics are assimilated better during the laboratory classes by using a series of kinematical models, models of real mechanisms and machine elements, and stands for experimental investigations. The current preparation of students is assessed during the lab classes through tests and control problems. The final evaluation is by a continuous assessment mark or an exam (if the continuous assessment mark is not ‘pass’).

1881 Dynamics of Machines and Structures

ECTS credits: 5 **Week load**: 2lec+0sem+0labs+2ps
Assessment: exam **Test type**: written
Department involved:
Department of Automobiles, Tractors and Fork-Lift trucks, and Department of Engineering Mechanics
Faculty of Mechanical and Manufacturing Engineering.
Lecturers:
Assoc. prof. Rusi Rusev, MEng, PhD, tel: 888524, E-mail: rgr@ru.acad.bg;
Assoc. prof. Georgi Gabrovski, MEng, PhD, tel: 888 474, E-mail: ggabrovski@ru.acad.bg.
Abstract:
The course acquaints the students with the dynamic model development of vehicles, machines and structures, the basic methods for analysis of the motion and the interaction in linear and nonlinear mechanical systems, as well as with contemporary analytical and numerical methods. Preliminary knowledge in Mathematics, Mechanics, Strength of Materials, Fluid Mechanics, and Machine Elements is required.
Course content:
Dynamic models – characteristics and methods for experimental characterization. Disturbing factors and their characteristics. Vibrations of discrete mechanical systems – beams and shafts. Dynamics of vehicles and structure state. Human body influence of the vibrations.
Teaching and assessment:
The learning material is presented in lectures with the allowable minimum of mathematical proafs and without redundant theory considerations. The assertions are illustrated with examples that could ease the students in the exercises. It is important that the students should work on their own in the practical classes. A computer lab is provided for the students’ work. The grading system determines the minimum required for the semester passing approval and the final grade - after two written tests. If the final grade of the semester is high enough, the student can get this as a final grade of the course to avoid the exam. The exam is written and consiosts of several theoretical questions and problems for solving.

1887 Automatic Development of Design Documentation

ECTS credit: 5 **Week schedule:** 2lec+0sem+0sem+3ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Torkom Norair Diulgerian, MEng, PhD, Dept. Machine Science and Machine Elements,
tel: 888 461; E-mail: tomy@ru.acad.bg;
Assoc. Prof. Emilia Angelova Angelova, MEng, PhD, Dept. Machine Science and Machine Elements,
tel: 888 461, E-mail: ang@ru.acad.bg.
Abstract:
The course Automatic Development of Design Documentationaims at introducing the students to the contemporary methods, approaches and possibilities for design, derived from using the computer systems AutoCAD and Solid Works. With the help of lectures and practical classes, knowledge and skills for modeling of machine elements and assemblies used in design documentation is accumulated, as well as general questions in line with the development and application of systems for automated design in machine building are discussed.

Course content:
2D geometrical modeling with AutoCAD. Modeling of machine elements with the help of surface models. Methods for creation and edition of 3D surfaces. 3D volumes. Multi-version design of objects. Table-parametrical dimensioning. Automatic generation of graphical design documents. Automatic generation of assemblies. Methodology of assemblies creation. Assembling procedures – limits and references. Creation of specifications. 3D volume modeling of objects with Solid Works. Creation of assemblies. Limits and references. Animations. Automatic creation of design documentation.
Teaching and assessment:
The topics of the lectures give possibility for the students to be made acquainted with the theoretical aspects and possibilities for automatic generation of design documentation with the systems AutoCAD and Solid Works. The practical classes are conducted in a specially equipped computer room. During the examination a complex task is developed, covering practices in modeling and implementation of design documents with AutoCAD and Solid Works.

1884 Precision Measurement, Manufacturability and Quality of Mechanical Structures

ECTS credits: 5 **Workload per week:** 2lec+0sem+0labs+2ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Machine Tools and Manufacturing
Faculty of Mechanical and Manufacturing Engineering.
Lecturers:
Assoc.Prof. Tsvyatko Stanev Korijkov, MEng, PhD, Department of Machine Tools and Manufacturing,
tel: 888 493, E-mail korijkov@ru.acad.bg.
Abstract:
The discipline is an important link in the chain of disciplines of the master's degree curriculum course High Technological Manufacturing Design. Through a variety of forms of teaching it gives purposeful knowledge and practical skills in: precision dimensioning, methods and means for specifying the quality indices of machine parts and the organization of quality control.
Course content:
Precision dimensioning of structures during design stages, according the standard series ISO 9000. Types of faults in mechanical structures– geometrical, deformation, heat and kinematical. Methods for calculating the faults of different elements. General methodology for precision dimensioning of mechanical structures. Theoretical basics of dimensional analysis. Methods for calculating the gear ratios of the elements. Methods for quality assurance of the closing link. Precision measurement for typical mechanical structures– bearing units, guides, thread leads, redactor gears and mechanical transmissions, leverage systems, clutches, casings, bodies, welded structures and frames.
Teaching and assessment:
Lectures, practical classes and a coursework. The lectures are visualized with slides. During the practical clases every student is given the oportunity to individually solve specific typical tasks or study problems that require additional clarification of the lectures. Each practical class ends with a solution of a specific problem. The exam is written and includes a test, based on the lectures, and solving a short practical case, regarding manufacturability assurance of a part, similar to the ones done in the practical classes. The final grade is decided in a discussion (if needed).

1883 Design of Transport Means

ECTS credits: 5 **Week load:** 2lec+0sem+0labs+2ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Automobiles, Tractors and Fork-Lift Trucks
Faculty of Automotive and Transport Engineering.
Lecturers:
Prof. Dimitar Jordanov Stanchev, MEng, PhD, 888 545, Dept. of Transport, E-mail: dstanchev@ru.acad.bg.
Abstract:
The course of Design, Research and Usage of Specialized Transport Means has the purpose to improve and extend the students' training, discipline and habit for scientific reearch work and studies in the field of design, research, exploitation and repair of specialized transport machines and their units. The lectures deal with controversial issues. From compulsory self-dependent work and education the students will receive professional, computing and language knowledge and also learn to work in a team.
Course content:
The lectures and exercises are grouped in three parts – design, research and usage of automobiles, tractors, cars; internal combustion engines and technical means for their maintenance. For self-dependent work there are: tests, manuals, atlases. They are found onf the University Website.
Teaching and assessment:
The students can get involved in research work in the university group. The students determine the time for work and learning on their own. The topic on which the students work can be transformed in graduation work. When students finish their work problems, they will receive a recommendation from their director of studies.

1882 Structure Calculations by Finite Element Method

ECTS credits: 5 **Week load**: 2lec+0sem+0labs+2ps
Assessment: exam **Test type**: written
Department involved:
Department of Engineering Mechanics
Faculty of Mechanical and Manufacturing Engineering
Lecturers:
Assoc. Prof. Ivelin Ivanov, MEng, PhD, tel. 888224, e-mail: ivivanov@ru.acad.bg.
Abstract:
The Finite Element Method (FEM) is confirmed to be a powerful method for solving problems of Solid and Structure Mechanics. It is applicable for problems of the heat conduction, mass transportation, diffusion, electrical and magnetic fields, as well as of the fluid mechanics. The aim of the discipline is that the students to gain the necessary minimum of knowledge about the principle of the FEM in order to use developed software to analyze the strength and strain of engineering objects in the design.
Course content:
After a short introduction, concerning the basic equations of the Theory of elasticity and some rules of the Matrix algebra, the basis of the FEM is elucidated based on the simplest finite element that could be chosen – a bar under tension and compression. Without any details, the common energy principles of Solid Mechanics and the corresponding equations, valid for a wide range of problems in the Solid Mechanics, are given to the students. Different types of finite elements that can be used for the discretezation of the objects being analyzed are considered. The essential and nonessential boundary conditions for different types of problems (as plane, plates, shells, axisymmetric, 3-D and so on) are discussed. A great attention is paid on the preparation of a problem for FEM solving.
Teaching and assessment:
The learning material is presented in lectures with the allowable minimum of mathematical proofs and without redundant theory considerations. The assertions are illustrated with examples that could facilitate the students in the practical classes. It is important that the students should work on their own in the practical classes. The aim is to learn how to use typical commercial software for Finite Element Analysis (FEA). The students have two assignments in the semester and several short check tests. A computer lab is provided for the student work. The grading system includes the assessments, inquiry tests and an exam test, all of which give the final grade of the course.

1885 Design and Optimization of Gear Drives and Speed Reducers

ECTS credit: 4 **Week schedule:** 3lec+ 0sem+0labs+3ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Emilia Angelova Angelova, MEng, PhD, Dept. of Machine Science and Machine Elements
tel: 888 461; E-mail: ang@ru.acad.bg;
Prof. Peter Nenov MEng, PhD, Dept. Machine knowledge and Machine elements, tel: 888 615,
E-mail: pnenov@hotmail.com.
Abstract:
The possibilities for improvements of the methods and approaches for design of involute cylindrical gears and speed reducers are explored, with the increased introduction of the element of gear parameters' optimization. An important special feature is the fact that not only pure theoretical matter is discussed in the course, but also numerous problems related to the software provision of the design activities in the field of gear drives are clarified, and the most important trends in its development are outlined.
Course content:
Automatic creation of geometrical blocking contours of involute cylindrical gears. Geometrical blocking contours of interconnected gears. Peculiarities in interconnected gears design. Automatic strength calculations of gears on different criteria. Creation of power blocking contours. Design of reducers. Optimal distribution of the gear ratio. Assessment of the effect of the optimization. Regeneration of big-module gears.
Teaching and assessment:
The lectures are conducted in lecture halls with equipment for presentations, while pure theoretical stages are visualized and interpreted based on self developed software. The practical classes are conducted in computer halls. The solving of sample design tasks with the help of the software sets aredeveloped by teams from the MME department and introduced in practice. The evaluation of the students' knowledge is conducted with tests based on the lectures, the practical knowledge and skills shown during the practical classes.

1886 Drive Systems

ECTS credit: 3 **Week schedule**: 2lec+ 0sem+0labs+2ps
Assessment: exam **Type of exam**: written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Antoaneta Dobreva, MEng, PhD, Dept. Machine Science and Machine Elements,
tel. 888 235, E-mail: adobreva@ru.acad.bg;
Assoc. Prof. Peter Stamatov, MEng, PhD, Dept. Machine Science and Machine Elements,
tel. 888 592, E-mail: stamatov@ru.acad.bg ;
Assoc. Prof. Peter Russev, MEng, PhD, Dept. "Thermotechnics and Hydraulics", tel. 888 585,
E-mail: prussev@ru.acad.bg.
Assoc. Prof. Emil Kuzmanov, MEng, PhD, Dep. Automatics, tel: 888 269; E-mail: kuzmanov@ru.acad.bg.
Abstract:
The course Drive Systems is intended to give to the students the necessary knowledge for mechanical, hydraulic and electric drives of machines and devices. During the first part the students are introduced to different types of mechanical actuators, as more attention is paid to the stage and stageless actuation (gear boxes and variator drives). During the second part, knowledge about volume hydraulic actuation is provided, the synthesis and analysis of principle schemes for actuation are examined, as well as precision machines. In the third part the students are introduced to the mechanics of electric power leading, electro-mechanical devices of DC and asynchronous motors, energy and electrical drive.
Course content:
Introduction to the course. Elements of the driving systems. Types of drives. Work conditions of the driving systems. Static and kinematics calculations. Stage and stageless mechanical actuators. Hydraulic drives. Types. Design principles and synthesis of hydraulic systems. Electrical drives. DC and AC drives.
Teaching and assessment:
The lectures are conducted using the classical method supported by technical devices for visualization. The laboratory classes are executed each week two hours per subgroup. For all laboratory classes forms based on templates are filled. During the semester two tests are scheduled. If the mean mark form both tests is very good, the student is released from examination. For the rest of the students a written examination is conducted.

1888 Automated System for machine design

ECTS credit: 4 **Week schedule:** 3lec+ 0sem+0labs+4ps
Assessment: continuous assessment **Type of exam:** written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering
Lecturers:
Assoc. Prof. Torkom Norair Diulgerian, MEng, PhD, Dept. of Machine Science and Machine Elements, tel: 888 461; E-mail: tomy@ru.acad.bg;
Prof. Peter Nenov, MEng, PhD, Dept. Machine knowledge and Machine elements, tel. 825 663, E-mail: pnenov@hotmail.com
Assoc. Prof. Emilia Angelova Angelova, MEng, PhD, Dept. of Machine Science and Machine Elements, tel: 888 461; E-mail: ang@ru.acad.bg.
Abstract:
The course in Automated System for Machine Design" has the purpose to introduce the students to the contemporary resources and possibilities for automated machine design. With the help of lectures and practical classes students gain thorough knowledge and lasting practical skills used in machine design and stress analysis of real constructive elements using special systems for machine design, Mechanical Desktop and Solid WORKS packet.
Course content:
Automated machine design of shafts, bearings, springs, screw connections – 2D and 3D. Stress analysis – 2D and 3D using systems for automated machine design Mechanical Desktop and Solid WORKS packet.
Teaching and assessment:
The topics of the lectures give possibility for the students to be acquainted with the theoretical aspects and possibilities for automated machine design. The practical classes are conducted in specially equipped computer rooms. During the examination a complex task is developed, covering machine design and stress analysis.

1889 Materials Handling Equipment

ECTS credits: 4 **Workload per week:** 2lec+0sem+0labs+4ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Theory of Mechanisms and Machines, Material Handling Engineering and Technologies Faculty of Agricultural and Industrial Engineering.
Lecturers:
Assoc. Prof. Georgy Getsov Kenarov, MEng, PhD, Dept. of Theory of Machines and Mechanisms, Materials Handling Equipment and Technologies, tel: 888 239, 888 664, E-mail: gkenarov@ru.acad.bg.
Pr. Assist. Prof. Toni Ivanov Uzunov, MEng, PhD, Dept. of Theory of Mechanisms and Machines, Material Handling Engineering and Technologies, tel: 888 239, 888 664, E-mail: tuzunov@ru.acad.bg.
Abstract:
The subject acquaints the students from the degree course Machine-building and Tool building with the construction, the technical and exploitation parameters, the calculation bases and designing of material handling equipment, transport machines and devices by using the obtained knowledge from the general technical subjects and the specializes subjects. The subject contributes both to forming the designer preparation of the future constructor engineers and to some specialization in designing of Materials Handling Equipment, which accompanies each manufacturing process.
Course content:
Introduction. Materials handling equipment and devices – classification, building elements; principle solutions and cinematic schemes; calculation, design and selection of elements; dynamic tests, selection of an engine and brake. Machines for non-stop transport - classification, parameters, elements and structure. Additional structures and equipment – structure; determination of the main parameters. General information for systems of material handling engineering.
Teaching and assessment:
The lectures acquaint the students with the main issues of the subject. Different visual materials are used like slides or OHP. The laboratory classes are held in the laboratory rooms of the department. There the students study the structure of different materials handling equipment and make tests. The exam starts with two questions, followed by oral discussion.

1890 Materials Handling Engineering

ECTS credits: 4 **Workload per week:** 2lec+0sem+0labs+4ps
Assessment: exam **Type of exam:** written
Department involved:
Department of Theory of Mechanisms and Machines, Material Handling Engineering and Technologies Faculty of Agricultural and Industrial Engineering.
Lecturers:
Assoc. Prof. Georgy Getsov Kenarov, MEng, PhD, Dept. of Theory of Machines and Mechanisms,
Materials Handling Equipment and Technologies тел. 888 239, 888 664 E-mail: gkenarov@ru.acad.bg.
Pr. Assist. Prof. Toni Ivanov Uzunov, MEng, PhD, Dept. of Theory of Mechanisms and Machines,
Material Handling Engineering and Technologies, tel: 888 239, 888 664, E-mail: tuzunov@ru.acad.bg.
Abstract:
The subject acquaints the students from the degree course Machine-building and Tool-building" with the construction, the technical and exploitation parameters, the calculation bases and designing of material handling equipment, transport machines and devices by using the knowledge obtained from the general technical subjects and the specializes subjects. The subject contributes both to forming the designer skills of the future constructor engineer and to some specialization in designing of Materials Handling Equipment, which accompanies each manufacturing process.
Course content:
Introduction. Materials handling equipment and devices – classification, building elements; principle solutions and cinematic schemes; calculation, design and selection of elements; dynamic tests, selection of an engine and brake. Machines for non-stop transport - classification, parameters, elements and structure. Additional structures and equipment – structure; determination of the main parameters. General information for systems of material handling engineering.
Teaching and assessment:
The lectures acquaint the students with the main issues of the subject. Different visual materials are used like slides or OHP. The laboratory classes are done in the laboratory rooms of the department. There the students study the structure of different materials handling equipment and make tests. The exam starts with two questions, followed by oral discussion.

1892 Optimal Design of Mechanical Systems

ECTS credits: 4 **Week load:** 2lec+0sem+0lab+4ps
Assessment: exam **Type of test:** written
Department involved:
Department of Engineering Mechanics
Faculty of Mechanical and Manufacturing Engineering.
Lecturers:
Assoc. prof. Venko Vitliemov, MEng, PhD, tel: 888 572, e-mail: venvit@ru.acad.bg ;
Assoc. prof. Ivelin Ivanov, MEng, PhD, tel: 888 472, e-mail: ivivanov@ru.acad.bg.
Abstract:
The students study the conceptual possibilities how to formulate an optimization problem for design of mechanical systems as well as how to analyze the results of the solution in the programming environment of MATLAB. Some techniques for interdisciplinary optimal design are also considered. The knowledge gained in the subject is useful in the design project developing during the training, as well as in the engineering practice.
Course content:
An introduction in the optimal design. Optimization problem formulation of mechanical systems design. Basic methods of optimization. Optimization in the programming environment of MATLAB. Sensitivity analysis. Multi-criteria design. Optimal design of dynamic systems. Modeling of the subjects under design.
Teaching and assessment:
The principles and the properties of the methods for optimization are presented in the lectures. Selected applied optimization problems are solved in the practical classes in the MATLAB programming environment. Each student has an assignment to solve an individual problem of optimization, which has all stages of the optimization process. There is individual informal discussion on the written results of the assignment at the end of the course.

1893 Analysis and Design of Systems

ECTS credit: 4
Week schedule: 2lec+ 0sem+0labs+4ps
Assessment: exam
Type of exam: written
Department involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Lecturers:
Assoc. Prof. Emilia Angelova Angelova, MEng, PhD, Dept. of Machine Science and Machine Elements,
tel: 888 461; E-mail: ang@ru.acad.bg.
Assoc. Prof. Atanas Slavkov Kolev, MEng, PhD, Dept. Machine Science and Machine elements,
tel: 888 461, E-mail: askolev@ru.acad.bg.
Abstract:
The academic course enables students to acquire knowledge for designing big machine systems. It links the basic knowledge in Engineering Design, Automatic Development of Design Documentation and Design of Transport Machines to Systems for Automated Design in Machine- building, Driving Systems and Diploma thesis and provides the realization of specific methods and designing skills in other academic courses.
Course content:
Introduction to system engineering. Basic characteristics of machine systems. Analysis systems. Application of the systematic approach. Functions and structure of machine systems. Design and systems. Features of ergonomic design. Comparative analysis of design decisions. The importance of artistic design to the process of systems design. The influence of fashion and technical style on design decisions. The significance of constructional and technological heredity to the process of designing. Characteristics of machine systems design.
Teaching and assessment:
The theoretical aspects from the lecture course are clarified by means of systematic analysis of typical examples. The practice sessions make theory clear by analyzing specific examples and decisions. During lectures and practice sessions a variety of multimedia products, portfolio, charts and design patterns are used. Students' individual application of knowledge is checked through solving a complex-valued assignment which is developed during seminars. The final assessment is based on the individual assignment mark, the test and the written exam.

1896 Master thesis

ECTS credits: 15
Weekly workload: 0lec+0sem+0labs+0ps
Assessment: official defence
Type of exam: oral
Departments involved:
Department of Machine Science and Machine Elements
Faculty of Automotive and Transport Engineering.
Consultants:
All lecturers from the Department
Abstract:
The Master thesis is an individual creative assignment, which is fulfilled under the leadership of a research lecturer and if necessary, under the leadership of a research consultant. Its objective is to give the opportunity to the students to show the accumulated knowledge and skills during their study for achieving the objectives and tasks of the Master thesis and to present their creative development successfully in front of an exam board.
Course content:
The Final Year Project contains: calculation explanatory note and graphical part
Teaching and assessment:
The Department of Machine Science and Machine Elements provides: the organization about collecting, confirming and announcing of theme suggestions for Master thesis; the distribution of themes and research leaders to the students; the leadership, review and presentation of the Master thesis.
Weekly tutorials with the research leaders are envisaged for the students. Then the process of fulfilment of the given assignment is monitored.
The final year student presents the Master thesis in front of the State Examination Commission.

Erasmus

ECTS

Information Package

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