DESCRIPTION OF THE COURSE

Name of the course: **Theory of internal combustion engines**	Code: **BpTMT01**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**
Course project (CP)	Code: **BpTMT07**	Number of credits: **3**

LECTURER(S):
Prof. Eng. Valyo Nikolov, PhD, (FME), tel.:032 659 594, e-mail: vnikolov@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technologies, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The students must to know the basics of ICE theory, mathematical modeling of the process taking place in the engines, the methods of thermal calculations and determination of the basic dimensions, taking their characteristics, etc.

DESCRIPTION OF THE COURSE: The subject acquaints the students with the processes taking place in piston internal combustion engines (ICE), which processes are associated with the transformation of heat energy into mechanical, the ways of their management and possibilities for their improvement. The thermodynamic and actual cycles of piston ICE are reviewed, as well as the indicator and effective factors, the work regimen and their characteristics. The influence of different factors on process flow is analyzed as well as the parameters and indices of petrol and diesel ICE. Attention is given to carburetion, super-filling and toxic substance generation in the cylinder and to such substance concentration in the exhaust gases of ICE and to the ways of their reduction.

PREREQUISITES: Fluid Mechanics, Mechanics, Thermodynamics and Heat Transfer and etc.

TEACHING METHODS: Lectures using multimedia, slides and others materials. Laboratory works for which reports are made and the reports are checked by the teacher. The course project contains thermal and dynamic calculation and construction of ICE..

METHOD OF ASSESSMENT: Written exam at the end of semester..

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Димитров П., Учебник по „Теория на двигателите с вътрешно горене“, Издателство на Технически Университет – София, 2000; 2. Маслинков С. и кол., Теория на двигателите с вътрешно горене, Издателство „Техника“, София, 1985; 3. Костов В., Николов В., Димитров Е., Амбарев К., Учебник по “Авиационни бутални двигатели”, Издателство „Хоризонти“, Пловдив, 2014; 4. Димитров, П. И., Ръководство за лабораторни упражнения по „Теория на ДВГ“, Технически Университет – София, 1999; 5. Генов, Г. Д. и В. Костов, Ръководство за курсово проектиране на ДВГ, Издателство „Техника“, София, 1986; 6. Николов В., Амбарев К., Ръководство за курсова работа по „Теория на ДВГ“, “Топлинно изчисляване на ДВГ с интерактивна програмна система”. Издателство „Хоризонти“, Пловдив, 2014.

DESCRIPTION OF THE COURSE

Name of the course: **Theory of Automobile**	Code: **BpTMT02**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)/Tutorials (T) Course work (CW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER(S):
Assoc. Prof. Eng. Krasimir Ambarev, PhD (FME), tel.: 032 659 575, e-mail:kambarev@tu-plovdiv.bg
Assist. Prof. Eng. Stiliyana Taneva, PhD (FME), tel.: 032 659 524, e-mail: s.taneva@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technologies, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to be able to know topics related to operating characteristics of the automobile, directly linked to his movement, power and torque on the driving wheels, interaction between wheels and road, traction performance, braking performance, handling, stability, cross-country ability and fuel effectiveness of the automobile.

DESCRIPTION OF THE COURSE: The main topics concern: Transmission of engine power to the driving wheels of the automobile; Interaction between wheels and road; Driving resistances on the automobile; Methods for calculating dynamic verification; Stability and handling; Opportunities for operating in off-road conditions; Fuel effectiveness of automobile; Influence of construction and operational factors on the dynamic properties of the automobile.

PREREQUISITES: Mathematics, Physics, Mechanics I and II, Theory of Internal Combustion Engines.

TEACHING METHODS: Lectures, using slides, laboratory and course work, protocols and course work description preparation and defence.

METHOD OF ASSESSMENT: Exam at end of semester (62%), laboratories (18%), course work (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Любенов С С., Б. Ангелов, Ив. Евтимов Автомобили и трактори. Експлоатационни свойства, Русе, 2004; 2. Семов Д., Н. Иванов, Д. Лозанов, Автомобили, трактори и кари, София, Техника, 1992; 3. Нейков С. А., Д. А. Кацов, П. И. Йорданов, С. И. Пенчев. Автомобилна техника I част. Ръководство за лабораторни упражнения. Пловдив, 2006; 4. Литвинов А. С., Я. Е. Фаробин. Автомобиль. Теория эксплуатационных свойств. Москва, „Машиностроение", 1989; 5. Meywerk M. Vehicle Dynamics, Automotive Series, John Wiley&Sons Ltd., 2015; 6. Rill G. Road vehicle dynamics: Fundamental and Modeling, Taylor & Francis Group, ISBN – 13: 978-1-4398-9744-7, 2012 ; 7. Wong J. Y. Theory of ground vehicles, Third edition, New York, ISBN 0-471-35461-9, 2001.

DESCRIPTION OF THE COURSE

Name of the course: **Manufacturing Technologies**	Code: **BpTMT03**	Semester: **5**
Type of teaching: Lectures (L) Tutorials (T)	Hours per semester: L – 30 hours T– 15 hours	Number of credits: **4**

LECTURER(S):
Assoc. Prof. Eng. Angel Lengerov, PhD (FME), tel.: 032 659613, e-mail: anlen@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory from the curriculum training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The goals of the discipline is to provide knowledge, related to the basic methods in machining used in industry and design of technology processes used for piece machining as well. It will supply the students with abilities to find out prompt and competent decisions related to the expedient application of machining methods and technology processes providing high quality and reliability of the units.

DESCRIPTION OF THE COURSE: The basic methods for machining by cutting – turning, drilling, broaching, milling, grinding ant the electro physical methods for machining are examined. The technological possibilities of the machining method, the tools, the machines and the cutting process are considered in every topic. Special attention is paid to the design of the technological process and the quality control of the manufactured details. Typical technological processes for characteristic details construction (beds, shafts, discs, elements of gears) and the technological processes for assembly, where special attention is paid to the methods for quality control, are considered.

PREREQUISITES: Necessary knowledge in the field of Mathematics, Physics, Chemistry, Mechanics, Materials Science.

TEACHING METHODS: Lectures using presentations and demonstration materials, tutorials with a report on the work done.

METHOD OF ASSESSMENT: Written exam.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. В. Георгиев, Ст. Пашов, Технология на машиностроенето, ISBN 954-8779-51-X, ТУ-София, Филиал Пловдив, 2003; 2. Ст. Пашов, П. Хаджийски, Технология на машиностроенето част 1, ISBN 954-438-203-8, ИПК ТУ - София, 1997; 3. В. Клепиков, Н. Султан-заде, В. Солдатов и др. Основы технологии машиностроения, ISBN 978-5-16-015145-8, Издательство Инфра-М, 2019; 4. Helmi Youssef, Hassan El-Hofy. Traditional Machining Technology - Machine Tools and Operation, ISBN 9781000097139, Publisher CRC Press, 2020; 5 Steve Krar. Machine Tool Technology Basics, ISBN: 9780831131340**,** Publisher Print On Demand, 2013; 6. В.Ю. Новиков , А.И. Ильянков, Технология машиностроения: Практикум и курсовое проектирование, ISBN 978-5-4468-0158-9, Издательство Academia, 2013.

DESCRIPTION OF THE COURSE

Name of the course: **Technology and Organization of Railway Transport**	Code: **BpTMT04**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 15 hours	Number of credits: **4**

LECTURER(S):
Prof. DSc. Svetla Stoilova (FT), Tel.:029653922; E-mail: stoilova@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: To acquire the knowledge and skills necessary for the individual theoretical and practical solution of problems, connected to the development of technologies and the organization in railway transport.

DESCRIPTION OF THE COURSE: The course gives the students the basic elements of the organization trading exploitation the railway transport. They studied problems of organization of railway transport flows; main indicators for the planning and organization of the railway transport; forecasting demand for rail services; methods for controlling the movement of trains; methods for the development of the organization of passenger and freight; the basic principles of developing the schedule for the movement of trains; determination of train capacity; foundations of European legislation in the field of rail transport; organization of urban railway traffic.

PREREQUISITES: Basic knowledge of Mathematics.

TEACHING METHODS: Lectures given with the aid of supporting materials, posters, slides. Laboratory work, carried out as per the laboratory work reports, prepared by the students and checked by the lecturer.

METHOD OF ASSESSMENT: Written exam at the end of 7th semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1.Стоилова, С. Организация и управление на железопътния транспорт., Издателство на ТУ-София, 2010; 2.Стоилова, С. Ръководство за курсов проект по организация и управление на железопътния транспорт., Издателство на ТУ-София, 2010; 3. С.Стоядинов, Св. Стоилова. Ръководство за лабораторни упражнения по технология и организация на транспорта – I част., Издателство на ТУ-София, 2006.; 4.Райков Р.Г., Организация и управление на железопътния транспорт, С., ВМЕИ, 1985, 5. Райков Р.Г., Д.К.Лозанов, Организация на движението на влаковете, С., ВВТУ "Т. Каблешков", 1992, 6.Панов, П. Актуални проблеми на икономиката на железопътния транспорт. С., Издателство на УНСС. 2000., 7. Bratoev, S., Sofia metropolitain., Sofia., Notabene, 2004; 8.Нормативни актове в железопътния транспорт., Част 1 и 2. Министерство на транспорта, 2006.; 9. Директиви и решения на ЕО, свързани с железопътния транспорт. Официален сайт на ИА „Железопътна администрация", http://www.railbg.com.,http://ec.europa.eu/transport/rail.

DESCRIPTION OF THE COURSE

Name of the course: **Performance materials in transport equipment**	Code: **BpTMT05**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 20 hours LW – 15 hours	Number of credits: **4**

LECTURER(S):
Assoc. Prof. Eng. Silviya Salapateva, PhD (FME), tel.: 032 659613, e-mail: sisisal@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory from the curriculum training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The course aims to acquaint students with the types of motor fuels, oils and greases, and some used technical fluids.

DESCRIPTION OF THE COURSE: The course is aimed at acquisition of theoretical knowledge and practical skills of students in the used performance materials in cars. Deals with indications, indicators and methods for testing materials under performance standards. Attention is drawn to the impact of the products used to change the physical state of the aggregates and components of vehicles. Special attention is paid to issues of technique and safety of the environment in the operation of automobiles.

PREREQUISITES: Basic knowledge of construction of automobiles and in the field of technology and management of road transport.

TEACHING METHODS: Lectures and laboratory exercises. Teaching in lectures is done by presenting the required standards, specifications and performance. The lectures are supported by numerous examples from actual practice. During laboratory classes the laboratory group performs the task set by the lecturer and. The task is to conduct research on various materials. The exercises are conducted in specially equipped laboratory.

METHOD OF ASSESSMENT: Written.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Виктор Вербицкий, Автомобильные эксплуатационные материалы, Издательство “Лань”, 2021; 2. Уханов А.П., Уханов Д.А., Глущенко А.А., Хохлов А.Л., Эксплуатационные материалы, ISBN 978-5-8114-3799-3, Издательство "Лань", 2019; 3. Wilfried J. Bartz, Engine Oils and Automotive Lubrication, ISBN 9780367402709, Published CRC Press, 2019; 4. Л. Василева, Д. Павлов, Автомобилни експлоатационни материали, С., Техника, 1992; 5. Н. Дленчев, Експлоатационни материали, С., Земиздат, 1982; 6. Горива и смазочни материали – част I и II. Сборник БДС. С. Стандартизация, 1983..

DESCRIPTION OF THE COURSE

Name of the course: **Finite Element Method**	Code: **BpTMT06**	Semester: **5**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 15 hours LW – 30 hours	Number of credits: **5**

LECTURER(S):
Assoc. Prof. Eng. Pepo Yordanov, PhD (FME), tel.: 032 659 514,
e-mail: piyordanov@tu-plovdiv.bg
Assist. Prof. Eng. Stanimir Penchev, PhD (FME), tel.: 032 659 632,
e-mail: spenchev@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technologies, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to enlarge the knowledge of the students about theory and application of Finite Element Method for structural analysis. To gain experience in using finite element software for solutions of static and dynamic problems.

DESCRIPTION OF THE COURSE: The main topics concern: Modelling of structures. Hypothesis and assumptions. Kinds of problems. Fundamentals of FEM: virtual displacements principle, discretization and approximation of unknown functions, element stiffness matrix and load vector, assembling. FEM for trusses and frames: variational formulation, shape functions, element stiffness matrix, problems. Plane problems: interpolation fields for triangle and quadratic elements, isoparametric formulation. Numerical integration. Axisymmetric problems, 3D problems. Modelling, errors and accuracy of FEM solution. Plates and shells: plate-bending theory, displacements, strains and stresses, finite elements for plates. Shells and shell theory: assumptions and hypotheses, displacements, strains and stresses. Shell elements, problems.

PREREQUISITES: Mathematics, Mechanics I and II, Strength of Materials.

TEACHING METHODS: Lectures using multimedia, laboratory works by using CAD/CAE systems.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (70%), laboratories (30%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Ташев М., Йорданов Р., Инженерен анализ с метода на крайните елементи, Екс-Прес, Габрово, 2012, ISBN – 978-954-490-350-3. 2. Максимов Й. Компютърни методи за инженерен анализ, Габрово, 1999. ISBN: 954-683039-9. 3. Стойчев Г. Метод на крайните елементи – якостен и деформационен анализ, София, 2000., ISBN – 978-954-490-350-3. 4. Bathe K.-J. Finite Element Procedures, second edition, ISBN-10: 0979004950, ISBN-13: 978-0979004957, 2014. 5. O. C. Zienkiewicz R. L. Taylor J.Z. Zhu, The Finite Element Method: Its Basis and Fundamentals, 7th Edition, eBook ISBN: 9780080951355, Hardcover ISBN: 9781856176330, Butterworth-Heinemann, 2013.

DESCRIPTION OF THE COURSE

Name of the course: **Sport**	Code: **FaSPR05**	Semester: **5**
Type of teaching: Self-Study (SS)	Hours per semester: SS – 30 hours	Number of credits: **1**

LECTURER(S):

Sen. Lect. Daniel Vladimdirov, PhD (FEA), Tel.: 032 659 646, E-mail: danielv@tu-plovdiv.bg,

Sen. Lect. Petar Doganov, PhD (FEA), E-mail: pdoganov@tu-plovdiv.bg,

Sen. Lect. Boris Spasov, PhD (FEA), E-mail: boris_spassov@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curricula for training of students to obtain Bachelor's degree, specialties „Mechanical Engineering and Instrumentation“, „Mechatronics“, „Computer Modelling and Mechanical Engineering“, Professional orientation 5.1 Mechanical engineering; specialties „Transport Machinery and Technology“, „Aeronautical Engineering” Professional orientation“ 5.5 Transport, Navigation and Aviation, specialties „Intelligent systems and artificial intelligence“, „Industrial Management“, “Graphic Design and Printing“, Professional qualification 5.13 General Engineering, Professional field 5 Technical Sciences..

AIMS AND OBJECTIVES OF THE COURSE: Targeted at further developing of students' physical activities, skills and hygiene habits through effective methods of physical education, improving their mental and physical performance.

DESCRIPTION OF THE COURSE: The knowledge and skills in Physical Education and Sports develop a wide range of motor skills and habits, help the hardening of the body and contribute to the moral development of students. The enhancement of physical skills is carried out through: 1. General Physical Preparedness – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience. 2. Sports-Specific Physical Preparedness – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curriculum presumes the minimum of knowledge and skills acquired at secondary school.

TEACHING METHODS: Seminars in accordance with the curriculum in PE and Sport.

METHOD OF ASSESSMENT: Evaluation is based on functional tests at the end of semester. Lecturer's signature is required at the end of semester and “Pass grade.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Владимиров В. Туризъм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.

DESCRIPTION OF THE COURSE

Name of the course: **Specialized English**	Code: **FaBpTMT02**	Semester: **5**
Type of teaching: Tutorials (T)	Hours per semester: T – 30 hours	Number of credits: **2**

LECTURER(S):

Sen. Lect. Konstantina Nyagolova (FME, English)	0887276513	konstantinanik@yahoo.com
Sen. Lect. Nadya Popova (FME, English)	659 707	popovanadia@yahoo.com
Sen. Lect. Anet Arabadjieva (FME, English)	0892231353	anet2003@abv.bg
Sen. Lect. Nadezhda Geshanova (FME, English)	0889314932	geshanova@tu-plovdiv.bg
Sen. Lect. Dr Daniela Valeva (FME, English)	0897899039	daniela.valeva89@gmail.com

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The course is targeted at further developing of students' language knowledge and practical skills in their specific professional field.

DESCRIPTION OF THE COURSE: The course is taught at language levels determined through placement tests, based on the compulsory foreign language course taken in Year 1 at TU – Sofia. No absolute beginner groups are formed. The course focuses on the further development of the four language skills in the domain of the students' major subject *Transport Equipment and Technologies*..

PREREQUISITES: Completed compulsory foreign language course LNG01 and LNG02 in Year 1.

TEACHING METHODS: Seminars targeted at further development of the four language skills through individual and team work using audio and video, as well as multimedia.

METHOD OF ASSESSMENT: Evaluation is based on continuous assessment and students get a grade at the end of the course.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: *1. Flash on English for Mechanics, Electronics and Technical Assistance, Sabrina Sopranzi; 2. Technical English, Pearson Longman; 3. Technical English for Professionals, Mark Ibbotson, Oxford University Press; 4. Career Paths: Engineering, Charles Lloyd,James A. Frazier - Jr MS, Express publishing*.

DESCRIPTION OF THE COURSE

Name of the course: **Design of Internal Combustion Engines**	Code: **BpTMT08**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW) Course work (CW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER(S):
Prof. Eng. Valyo Nikolov, PhD, (FME), tel.: 032 659 594, e-mail: vnikolov@tu-plovdiv.bg
Technical University of Sofia Branch

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technologies, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The students must to know the basics of construction, design and calculations of the internal combustion engines (ICE).

DESCRIPTION OF THE COURSE: Kinematics, dynamics and balance of the ICE. Construction and calculations of the elements Construction and calculation of the housing parts of the ICE. Construction and calculation of the separate units of crank mechanism of ICE. Construction and calculation of the separate units of gas distribution mechanism of ICE.

PREREQUISITES: Mathematics, Physics, Mechanics, Theory of Internal Combustion Engines, Design of Internal Combustion Engines, Theory of Automobile, Design of Automobile and etc.

TEACHING METHODS: Lectures using multimedia, slides and others materials. Laboratory works for which reports are made and the reports are checked by the teacher. The course work contains a strength calculation of the main parts of the ICE.

METHOD OF ASSESSMENT: Written exam at the end of semester.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. Димитров П., Учебник по „Теория на двигателите с вътрешно горене“, Издателство на Технически Университет – София, 2000; 2. Бояджиев К. и кол., Конструкция, проектиране и изчисляване на ДВГ, Издателство "Техника", София, 1984; 3. Костов В., Николов В., Димитров Е., Амбарев К., Учебник по “Авиационни бутални двигатели”, Издателство „Хоризонти“, Пловдив, 2014; 4. Генов Г., Костов В., Ръководство за курсово проектиране на ДВГ, Издателство „Техника“, София, 1986; 5. Николов В., Амбарев К., Ръководство за курсова работа по „Теория на ДВГ“, “Топлинно изчисляване на ДВГ с интерактивна програмна система”. Издателство „Хоризонти“, Пловдив, 2014.

DESCRIPTION OF THE COURSE

Name of the course: **Construction of Automobile**	Code: **BpTMT09**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **6**
Course project (CP)	Code: **BpTMT14**	Number of credits: **3**

LECTURER(S):
Prof. Eng. Valyo Nikolov, PhD (FME), tel.:032 659 594, e-mail: vnikolov@tu-plovdiv.bg
Assist. Prof. Eng. Stiliyana Taneva, PhD (FME), tel.: 032 659 524, e-mail: s.taneva@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technologies, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Aim of the course is to enlarge the knowledge of the students about the constructions, design and construction of units, assemblies and systems of the automobile.

DESCRIPTION OF THE COURSE: The main topics concern: Layout of automobiles; Arrangement of transmissions; Construction, design and calculations of clutches; Layshaft gearboxes; Epicyclic gearboxes; Automatic transmissions; Transfer gearboxes; Propeller shafts and universal joints; Bevel gears; Differentials; Axle shafts and final drive; Axles; Wheels and tires; Brake systems; Steering systems; Suspension; Frame.

PREREQUISITES: Mechanics I and II, Strength of materials, Engineering Graphics, Machine elements, Theory of Mechanisms and Machines, Theory of Internal Combustion Engines, Theory of Automobile, Finite Element Method.

TEACHING METHODS: Lectures, using slides, laboratory work with protocols and course project description preparation and defence. In the course project, executed in compliance with a manual, the students make design and calculations of assemblies and systems of automobile, using CAD systems.

METHOD OF ASSESSMENT: Written exam at end of semester (80%), laboratories (20%). The course project is assessed separately.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Кацов Д. А., Димитров Й. Н. Колесни и верижни машини, ТУ-София, филиал Пловдив, 2005; 2. Морчев Е. П. Проектиране и конструиране на автомобила, София, “Техника”, 1991; 3. Кацов Д. А., Петров Ц. Автомобилна техника – II част – ръководство, ТУ-София, филиал Пловдив, 2004; 4. Димитров Й. Н. и др. Ръководство по проектиране, конструиране и изчисляване на автомобила, трактора и кара, София, “Техника”, 1980; 6. Лукин П. П. и др. Конструирование и расчет автомобиля, Москва, “Машиностроение”, 1984. 7. Вахламов В. К. Автомобили. Основы конструкции, учебник для вузов., Транспорт, Москва, 2008; 8. Meywerk M. Vehicle Dynamics, Automotive Series, First Edition, John Wiley&Sons Ltd., 2015.

DESCRIPTION OF THE COURSE

Name of the course: **Railroad cars**	Code: **BpTMT10**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 30 hours	Number of credits: **5**

LECTURER(S):
Assoc. Prof. Eng. Svetoslav Slavchev, PhD (FT), tel.: 965 2932, e-mail: slavchev_s_s @tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technologies, Professional orientation 5. 5. Transport, navigation and aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The purpose of the training in Railroad cars is to ensure the theoretical fundamentals necessary for the students to study the special subjects and to learn about the railway equipment and its construction.

DESCRIPTION OF THE COURSE: This subject introduces the students to the wagon construction, its systems and parts. It deals with the theory and methodology of wagon design. The lectures provide the students with information about the structure of the national and international railways.

PREREQUISITES: Knowledge of the fundamental subjects included in the syllabus of the Transport Equipment and Technology speciality is essential.

TEACHING METHODS: The lectures and laboratory works are given using slides. The drawings, schemes and all the other visual aids are compiled in a textbook published by the University publishing house.

METHOD OF ASSESSMENT: Assessment of the students' knowledge is complex and consists of 2 components: final exam – a written examination – the students draw tickets, containing 2 main and 2 auxiliary questions, entry test before every laboratory task – students' knowledge is evaluated individually on score system and then converted into an assessment from 2 to 6 (2 being below the pass mark and 6 being excellent).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:
1. В. Стоилов и С. Славчев, Вагони, София: Технически университет - София, 2014; 2. Стоилов, В. М., Славчев, С., Мазнички, В., Албум по дисциплината "ВАГОНИ", ТУ-София, 2020; 3. Стоилов В., О. Кръстев, К. Велков. Ръководство за лабораторни упражнения по дисциплината Железопътна техника-1, С., ТУ-София, 2007**;** 4. Стоилов, В. М. Ръководство за курсово и дипломно проектиране по дисциплината "Вагони". С., ВМЕИ, 1986; 5. Шадур, Л. и др. Вагоны. М., Транспорт, 1980; 6. Кузмич, Л. и др. Вагоны. М., Транспорт, 1980; 7. Гайдаров, С., С. Тасев. Железопътни вагони и влакови спирачки. С., Техника, 1984.

DESCRIPTION OF THE COURSE

Name of the course: **Technology and Organization of Road Transport**	Code: **BpTMT11**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)/Tutorials (S)	Hours per semester: L – 30 hours LW – 15 hours	Number of credits: **4**

LECTURER(S):
Assoc. Prof. Eng. Silviya Salapateva, PhD (FME), tel.: 032 659613, e-mail: sisisal@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory from the curriculum training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Aim of the course is to make students familiar with discovery and management of the basic regular connections between qualities of the vehicles, parameters of the transportation process and efficacy and safety of automotive transportations.

DESCRIPTION OF THE COURSE: The course includes general description of methodical, technological and organizational parameters of the automotive transport activity. They are concerned to the grounds of choosing the right type of vehicles, organization of transportation along different directions, appraisal and analysis of the transportation's efficacy. Basic moments of the technology and organization of the urban bus transportations are exposed.

PREREQUISITES: Construction of the car, Construction of internal combustion engines, Loading and unloading processes.

TEACHING METHODS: Lectures using presentations and demonstration materials, and the results of laboratory exercises are formed in protocols.

METHOD OF ASSESSMENT: Two one-hour assessments at mid and end of semester (80%), laboratories (20%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Пенков, И. К, Основи на автомобилния транспорт. София, Печатна база на ТУ-София, 1997 г.; 2. Враджалиев, И. В. Организация на експлоатацията на транспорта. София, Техника 1985 г.; 3.Пенков И. К., Василев В. И. Ръководство за курсово проектиране по товарни превози. Печатна база на ТУ-София, 1991 г. 4. Афанасиев Л. Л; 4. Горев А.Э. Грузовые автомобильные перевозки, ИД Академия, 2008; 5. Горев А.Э. Организация автомобильных перевозок и безопасность движения - учебное пособие, SBN:978-5-4468-0263-0, Издательство:Академия, 2013.

DESCRIPTION OF THE COURSE

Name of the course: **Electrical Equipment of Transport**	Code: **BpTMT12**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 30 hours LW – 15 hours	Number of credits: **4**

LECTURER(S):

Assoc. Prof. Eng. Nikola Georgiev, PhD (FEA), tel.:032 659592,
e-mail: nikola.georgiev@tu-plovdiv.bg
Assist. Eng. Nikolai Paunkov, PhD (FEA), tel.:032 659687, e-mail: nick123@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject from the curriculum training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: To give students knowledge in general theory and the basic principles of operation of electrical equipment in transport.

DESCRIPTION OF THE COURSE: Main topics: Voltage regulators, initial start-up systems, electronic ignition systems, measuring instruments and electronic control systems.

PREREQUISITES: Physics, Electrical Engineering and Electronics.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and course work, work in teams, protocols.

METHOD OF ASSESSMENT: Exam with two questions.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Илиев Л, Б.Трайков, Електрически уредби на автомобилите и тракторите, Техника, София, 1990. 2. Трайков Б. Електроника в автомобила, Техника, София, 1997. 3. Ю.П. Чижков, Электрооборудование автомобилей, Машиностроене, Новосибиркс 2002. 4.Тошков Г. П., 'Електроника', ТУ- Варна, 2005. 5.Erickson R, D. Maksimovic, 'Fundamentals of Power Electronics'KAP, Massachusetts, USA, 2001.

DESCRIPTION OF THE COURSE

Name of the course: **Oscillations and Measurements in Transport Equipment**	Code: **BpTMT13**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW))	Hours per semester: L – 30 hours LW – 15 hours	Number of credits: **4**

LECTURER(S):
Prof. Eng. Valyo Nikolov, PhD, (FME), tel.:032 659 594, e-mail: vnikolov@tu-plovdiv.bg
Assist. Prof. Eng. Atanasi Tashev, PhD (FME), tel.: (+359 32) 659 626,
e-mail: atanasi.tashev@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for training of students to obtain Bachelor's degree, specialty Transport Equipment and Technologies, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: The goal of the course "Oscillations and Measurements in Transport Engineering" is the students to study and practically apply methods and tools for measuring and analysing oscillations in transport engineering. The course aims to develop an engineering approach for identifying vibration parameters. Upon completion of the course, the student will understand the fundamental concepts of measurement and oscillations and will be able to determine the main characteristics of oscillatory systems. This knowledge will enable them to quickly and competently address issues related to vibrations and conduct engineering experiments during tests of components, mechanisms, and automotive equipment as a whole.

DESCRIPTION OF THE COURSE: The course covers the following main topics: Vibrating Mechanical Systems: Examination of harmonic oscillations, dynamics, and superposition of harmonic oscillations; free damped and undamped oscillations of linear systems with up to two degrees of freedom; natural modes; Forced oscillations of linear mechanical systems with One degree of freedom, with and without considering resistance, amplitude-frequency characteristics under force, inertial, and kinematic disturbances, as well as phase-frequency characteristics; vibration protection of mechanical systems; Oscillations of certain special systems: free oscillations of a vehicle in the longitudinal vertical plane; distribution of support reactions during acceleration and braking of vehicles with front and rear-wheel drive; resistance forces during incline climbing and air resistance; transverse oscillations of rotating shafts; critical angular velocities of cardan shafts; Measurement of vibration parameters and vibration tests for the automotive industry.

PREREQUISITES: For students to successfully comprehend and study the course content, basic knowledge in mathematics and mechanics is necessary.

TEACHING METHODS: The lecture material for the course is based on contemporary literature sources, focusing on both fundamental scientific principles and specific issues related to the automotive industry. During the lectures, special attention is given to the specific requirements of the automotive industry concerning the loads and testing methods of vehicle components. The lectures are delivered using visual aids, computer, and projection equipment. During the laboratory exercises, problems based on the information from the lecture course are examined. Through the use of software applications, numerical computer analysis of specific problems is performed.

METHOD OF ASSESSMENT: The achievement of the course's objectives is monitored through continuous assessment, which is composed of the grades from two tests during the semester, each contributing 50%. These tests determine the level of knowledge acquisition and the ability to

comprehend the material studied during the semester, both from the conducted classes and from self-preparation.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY:

1. Genov, Yu., Polohronov, G., Kralov, Iv. Oscillations and Measurements in

Transport Equipment - methodical guide for laboratory exercises (in Bulgarian), Issue TU-Sofia, 2007.

3. Clifford, M., Brooks, R., Choi K., Giddings, D., Howe, A., Hyde, T., Jones, A. and Williams, E. An introduction to mechanical engineering, part 2, Hodder Education, Great Britain, 2010.

4. Volkswagen Group standard, VM80000, Issue 07-2021.

5. Кобиларов, Р., Хлова, Е., Николов, С., Тестови върпоси и задачи по физика Част II, Сборник, София, 2006

6. Baren, J., Random vibration testing, Vibration Research Corporation, United States, 2020

7. EN 60068-2-64, European Standard, Environmental testing – Part 2-64: Tests – vibration, broadband random and guidance, 2008.

8. Mercedes-Benz Company standard, Electric and Electronic Components in Motor Vehicles – Environmental Requirements and Tests, 07-2022.

9. Continental, Test Specification Basic, Pressure sensors, 10-2018.

10. Irvine, T., Power spectral density units: [G^2 / Hz], March 15, 2007.

11. Irvine, T., Shock and vibration response spectra course.

12. Irvine, T., an introduction to the vibration response spectrum, Rev.D, 16 June 2009.

13. Volkswagen Group standard, TL 956, 02-2019.

DESCRIPTION OF THE COURSE

Name of the course: **Sport**	Code: **FaSPR06**	Semester: **6**
Type of teaching: Self-Study (SS)	Hours per semester: SS – 30 hours	Number of credits: **1**

LECTURER(S):

Sen. Lect. Daniel Vladimdirov, PhD (FEA), Tel.: 032 659 646, E-mail: danielv@tu-plovdiv.bg,

Sen. Lect. Petar Doganov, PhD (FEA), E-mail: pdoganov@tu-plovdiv.bg,

Sen. Lect. Boris Spasov, PhD (FEA), E-mail: boris_spassov@tu-plovdiv.bg

Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curricula for training of students to obtain Bachelor's degree, specialties „Mechanical Engineering and Instrumentation“, „Mechatronics“, „Computer Modelling and Mechanical Engineering“, Professional orientation 5.1 Mechanical engineering; specialties „Transport Machinery and Technology“, „Aeronautical Engineering” Professional orientation“ 5.5 Transport, Navigation and Aviation, specialties „Intelligent systems and artificial intelligence“, „Industrial Management“, “Graphic Design and Printing“, Professional qualification 5.13 General Engineering, Professional field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Targeted at further developing of students' physical activities, skills and hygiene habits through effective methods of physical education, improving their mental and physical performance.

DESCRIPTION OF THE COURSE: The knowledge and skills in Physical Education and Sports develop a wide range of motor skills and habits, help the hardening of the body and contribute to the moral development of students. The enhancement of physical skills is carried out through: 1. General Physical Preparedness – in these seminars the students develop a wide range of motor skill and habits; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience. 2. Sports-Specific Physical Preparedness – students improve their sport skills and habits in a specific sport and gain experience through participation in competitions; work to improve strength, speed, endurance, flexibility, structure and skill; increase resistance to unfavourable environmental factors; develop their physical qualities and experience.

PREREQUISITES: The curriculum presumes the minimum of knowledge and skills acquired at secondary school.

TEACHING METHODS: Seminars in accordance with the curriculum in PE and Sport.

METHOD OF ASSESSMENT: Evaluation is based on functional tests at the end of semester. Lecturer's signature is required at the end of semester and “Pass grade.

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. Владимиров В. Туризъм и ориентиране. Методическо ръководство за студентите от ТУ София, филиал Пловдив. Издателство на ТУ - София. 2010.

DESCRIPTION OF THE COURSE

Name of the course: **Project Management**	Code: **FaBpTMT03**	Semester: **6**
Type of teaching: Lectures (L) Laboratory work (LW)	Hours per semester: L – 15 hours LW – 30 hours	Number of credits: **3**

LECTURER(S):
Accos. Prof. Georgi Georgiev(FME), PhD tel. 659 706, email: georgi@tu-plovdiv.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Facultative subject from the curricula for training of students to obtain Bachelor's degree, specialty Transport Machinery and Technology, Professional orientation 5.5 Transport, Navigation and Aviation, Field 5 Technical Sciences.

AIMS AND OBJECTIVES OF THE COURSE: Upon completion students will have basic knowledge of the Project Management processes and will acquire skills for identifying project ideas and turning them into project proposals of different forms.

DESCRIPTION OF THE COURSE: The main topics concern: The course is focused on identifying project ideas and turning them into project proposals. Main topics are: Definitions of Project management, Projects and types of projects; The project as an instrument for meeting organizational needs and attracting funding; Methods and techniques for project development; Main elements of the project cycle and the project proposal; Developing project activities and identifying necessary resources; Project budgeting; Project implementation and management; Project teambuilding.

PREREQUISITES: -

TEACHING METHODS: Lectures with slides and topic discussions; lab work including group case study discussions.

METHOD OF ASSESSMENT: Final written exam.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. Adrienne Watt, Project Management, Victoria, B.C.: BCcampus., 2014. ISBN 978-1-77420-012-4; 2. A Guide to the Project Management Body of Knowledge (PMBOK Guide), Sixth Edition 2017, ISBN: 978-1-62825-390-0; 3. Stephen Barker and Rob Cole, Brilliant Project Management: What the best project managers know, do, and say; Pearson 2014 , ISBN9780273775096; 4. Joseph Heagney, Fundamentals of Project Management, Fourth Edition; 2012 American Management Association, ISBN-13: 978-0-8144-1748-5; 5. Lee A. Swanson, Business Plan Development Guide, Saskatoon, Saskatchewan 2017, ISBN 978-0-88880-618-5; 6. Владимир Иванов,. „Ръководство за подготвяне на бизнес план“ на Център по предприемачество към Технически университет – София, филиал Пловдив, 2010.