

Field of Study: Road vehicles Engineering

Programme of studies: Conception and Design of the Modern Vehicles

First year of study:

Subject of study: Advanced solutions for vehicles

CODE: D22CPAM101

Number of credits: 4

Year/Semester: 1st year , 1st semester

Type of Course: Mandatory

Objectives: Knowledges understanding and deepening by the master studets of the construction and operation of advanced vehicle systems. Establishment of operating conditions, vehicle operating requirements and the choice criteria as transport solutions.

Content: Power-driven vehicles - short history. Getting Started about Electric Vehicle Traction. Power storage devices. Electric vehicles with traction battery. Construction and operating of a pure electric propulsion vehicle. Hybrid cars. Classification, methods of operating, advantages of hybrid propulsion comparative with the conventional systems. Basic architectures of the hybrid propulsion chain. Hybrid chains: series, parallel and mixed.

Teaching Leanguage: Romanian

Evaluation: written/ oral examination

Bibliography:

Mehrdad Ehsani, Yimin Gao, Ali Emadi , „Modern Electric, Hybrid Electric, and Fuel Cell Vehicles”,CRC Press, 2009

3Nan Qin, „Electric Vehicle Architectures”, Electric vehicule transportation Center, 2016

Neagoe, D, „ Transmisia Autovehiculelor, Editura Universitaria » Craiova, 2008.

Neagoe D, Pană Gabriela Monica „Soluții avansate de vehicule”- notițe de curs –Notițe redactate - în curs de finalizare , Suport informatic

Oprîșă - Stănescu P. D., „Autovehicule electrice, hibride și cu pile de combustie”, Editura Politehnica, 2015

Otat, V, „Dinamica Autovehiculelor, Editura Universitaria, Craiova, 2005.

Pană Gabriela Monica, „Soluții avansate de vehicule”- suport teoretic pentru activitatea de laborator - Notițe redactate și multiplicat

Pană Gabriela Monica “Echipamente speciale pentru alimentarea motoarelor de automobile”, 2006, Editura Universitaria Craiova

PUȘCAȘ Ana-Maria,“Structuri hibride celulare integrate pentru creșterea eficienței energetice a sistemelor mobile” teza de doctorat, Universitatea Transilvania din Brașov, 2011

Racicovschi V., Danciu G., Chefneux Mihaela, „ Automobile electrice si hibride”, Electra (ICPE) 2007

Vladimir A. Katić, „Electrification of the vehicle propulsion system – an overview”, FACTA UNIVERSITATIS, Series: Electronics and

Energetics, 2011.

Subject of study: Advanced modelling and simulation techniques in Mechanical Engineering

CODE: D22CPAM102

NUMBER OF CREDITS: 5

YEAR/SEMESTER: 1st year/1st semester

TYPE OF COURSE: Technical culture of specialty.

OBJECTIVES: The course addresses to students from first year - Master "Design and Concept of Modern Auto vehicles" at Faculty of Mechanics. The students needs to have acknowledgements from the following domains: Mechanics, Strength Materials, Machine Elements, Mechanical Systems Modelling Basics, Automotive Dynamics, Automotive Design and Calculations. The course follow to promote the modern design methods, finite element modelling and analysis in the aim of solving some complex problems from Automotive Engineering. Another aim is the one that it can be develop and form, the students ability through applications by using important modelling and analysis software (ADAMS, ANSYS, etc.). All of these are used for studying the behavior in static and dynamic mode of subassemblies from modern auto vehicles frame.

CONTENT: Theory of Elasticity Elements. 3D Modelling Techniques of Mechanical Systems. Mathematical Models for Finite Element Analysis in Static Mode for Mechanical Structures. Numerical Applications by Using MATLAB. Mathematical Models for Finite Element Analysis in Dynamic Mode for Mechanical Structures. Numerical Applications by Using MATLAB. Modal Analysis of Mechanical Structures. Finite Element Modelling in Contact Problems Cases. Mechanical Structures Analysis in Thermal-Structural Coupled Mode. Finite Element Modelling and Simulation of an Impact Problems on Automotive Engineering.

TEACHING LANGUAGE: Romanian

EVALUATION: Written examination

BIBLIOGRAPHY (selective):

Amirouche, F., Computational methods in multibody dynamics, Prentice-Hall, 1992.

Buculei M., Marin, M., Elemente de mecanică tehnică. Teorie și aplicații, Ed. Universitaria, Craiova, 1994.

Brătianu, C., Metode cu elemente finite în dinamica fluidelor, București, Ed.Academiei, 1983.

Corless, R.M., Essential in Maple, Springer-Verlag, 1995

Dumitru N., Margine A., Bazele modelării în ingineria mecanică.Editura Universitaria Craiova, 2002.

Dumitru N., Margine A., Organe de mașini. Asamblări. Elemente elastice. Proiectare asistată de calculator. Editura Universitaria Craiova, 2002.

Dumitru N., Margine, A., Catrina, Gh., ș.a., Organe de mașini. Arbori și lagăre. Proiectare asistată de calculator, Editura Tehnica, București, 2008, ISBN 978-973-31-2332-3.

Dumitru, N., Nanu, Gh., Mecanisme și transmisii mecanice, Editura Didactică și Pedagogică, Craiova, 2008.

Logan, Daryl, A First Course in the Finite Element Method, PWS Publishing Company, Boston, 1992.

Alexandru, P., Vișa, I. ș.a., Modelarea statico-dinamică a mecanismelor de ghidare ale roților automobilelor, Ed. LUX LIBRIS, Brașov, 2005.

Neagoe, D., Calculul și construcția autovehiculelor, vol.I, II, Ed.Universitaria, Craiova, 2000.

Oțăt, V., Bolcu, D., Thierheimer W., Simniceanu, L., Dinamica autovehiculelor, Ed.Universitaria, Craiova, 2005.

Alexandru, P., Vișa, I. ș.a., Modelarea statico-dinamică a mecanismelor de ghidare ale roților automobilelor, Ed. LUX LIBRIS, Brașov, 2005.

Neagoe, D., Studiul stabilității și maniabilității autoturismelor românești, în vederea îmbunătățirii acestora, teza de doctorat, 2000.

Neagoe, D., Calculul și construcția autovehiculelor, vol.I, II, Ed.Universitaria, Craiova, 2000.

Ansys theory reference, 8th Edition SAS IP, Inc.

Adams flex guide Mechanical Dynamics rev. 10.0.

Subject of study: Optimization of mobile mechanical systems

CODE: D22CPAM103

Number of credits: 5

Year/Semester: 1st year , 1st semester

Type of Course: optional

Objectives: Learning by the students of the theoretical and instrumental methods, means and procedures for the optimization of mobile mechanical systems.

Content: Kinematic and dynamics modeling by computational methods of mobile mechanical systems. General Aspects of Optimizing Problems. Numerical methods to solve minimal and maximum problems. Topological optimization (constructive) by the finite element method of mechanical structures. Solving optimization problems with and without constraints (restriction functions). Theoretical aspects on multiple objective optimization problems. Theoretical aspects regarding the stability of dynamic systems (Lyapunov stability of systems). System optimization issues. Theoretical aspects regarding the use of software for the optimization of mobile mechanical systems (ADAMS, ANSYS). Application study on the optimization of a mobile mechanical system by parametric methods

Teaching Language: Romanian

Evaluation: written/ oral examination

Bibliography:

Amirouche, F., Computational methods in multibody dynamics, Prentice-Hall, 1992.

Buculei M., Marin, M., Elemente de mecanică tehnică. Teorie și aplicații, Ed. Universitaria, Craiova, 1994.

Brătianu, C., Metode cu elemente finite în dinamica fluidelor, București, Ed.Academiei, 1983.

Corless, R.M., Essential in Maple, Springer-Verlag, 1995

Dumitru N., Margine A., Bazele modelării în ingineria mecanică.Editura Universitaria Craiova, 2002.

Dumitru N., Margine A., Organe de mașini. Asamblări. Elemente elastice. Proiectare asistată de calculator. Editura Universitaria Craiova, 2002.

Dumitru N., Margine, A., Catrina, Gh., ș.a., Organe de mașini. Arbori și lagăre. Proiectare asistată de calculator, Editura Tehnica, București, 2008, ISBN 978-973-31-2332-3.

Dumitru, N. Margine, A.,Asamblări. Elemente elastice. Proiectare asistată. Editura Universitaria, Craiova, 2002.

Dumitru, N., Angrenaje cilindrice. Proiectare asistată de calculator, Editura Universitaria, Craiova, 2000.

Dumitru, N., Nanu, Gh., Mecanisme și transmisii mecanice, Editura Didactică și Pedagogică, Craiova, 2008.

Dumitru, N., Organe de mașini. Angrenaje. Elemente de proiectare, R. Univ. Craiova, Craiova, 1996.

Dumitru, N., Organe de mașini. Transmisii mecanice. R. Univ. Craiova, Craiova,1996.

Dumitru, N.,Margine, A.,Bazele modelării în ingineria mecanică. Editura Universitaria, Craiova, 2002.

Gafițeanu, M., Elemente finite și de frontieră cu aplicații la calculul organelor de mașini, Ed. Tehnică, 1987.

Dudita F., Diaconescu D., Optimizarea structurala a mecanismelor, Ed. Tehnica, Bucuresti, 1987.

Moise, V., Moise M., Iaciu Ghe., Metode de optimizare neliniara, Editura Printech, 2008.

Moise V., Simionescu I., Ene M, Sinteza optimala a mecanismelor cu came, Ed. Printech, 2011.

Predoi M., Capitoile de matematici aplicate, Optimizarea sistemelor, Ed. Universitaria, Craiova, 1999.

Quiza R., Beruvides G., Davim J.P. (2014) Modeling and Optimization of Mechanical Systems and Processes. In: Davim J. (eds) Modern Mechanical Engineering. Materials Forming, Machining and Tribology. Springer, Berlin, Heidelberg, https://link.springer.com/chapter/10.1007%2F978-3-642-45176-8_8

Boyd S., Vandenberghe L., Convex Optimization, Cambridge, 2009, https://web.stanford.edu/~boyd/cvxbook/bv_cvxbook.pdf

Eberhard P., Held A., Optimization of Mechanical Systems, Stuttgart, http://www.itm.uni-stuttgart.de/courses/optimization/pdfs/Leaflets_WT1_112.pdf

Suresh K., Optimization of Mechanical Systems ME 748: Class Notes, Madison, <http://www.mecheng.iisc.ernet.in/~suresh/me256/ME748ClassNotesKSuresh.pdf>

Rodolphe Le Riche, Global optimization of mechanical systems, Ecole Nationale Supérieure des Mines de Saint-Etienne, 2008, <https://tel.archives-ouvertes.fr/tel-00476005/document>

Necoara I., Metode de optimizare numerica, Bucuresti, 2003, http://141.85.225.150/courses/curs_to.pdf

Grigore O., Tehnici de optimizare in programare, Bucuresti, Cursuri si laboratoare, http://ai.upb.ro/resources/files/TOP/TOP_0_img.pdf,

http://www.ai.pub.ro/resources/files/TOP/TOP_2_img.pdf, <http://ai.pub.ro/resources/files/TOP/lab1.pdf>, Kazuhiro Saitou, Kazuhiro Izui, Shinji Nishiwaki, Panos Papalambros, A Survey of Structural Optimization in Mechanical Product Development, in: Transactions of the ASME, Vol. 5, SEPTEMBER 2005, <http://www-personal.umich.edu/~kazu/papers/jcise-05-survey.pdf>

Maple 18, User's guide.

ANSYS 12, User's Guide.

MathCad 2001 –User's Guide, Mathsoft Engineering & Education, Inc. Cambridge, USA, 2007.

MSC. ADAMS user manual

Subject of study: Advanced elements of road vehicle dynamics

CODE: D22CPAM104

NUMBER OF CREDITS: 4

YEAR/SEMESTER: 1st year/1st semester

TYPE OF COURSE: mandatory

OBJECTIVES: presentation of theoretical concepts and practical concepts of kinematic and dynamic theories that define vehicle motion, advanced knowledge in the field of dynamical systems, vehicle dynamics, chaotic movements and the use of specialized computer programs or simulation of vehicle movement

CONTENT: Dynamical systems theory. Stability of dynamical systems. Chaotic movements: Methods of study. Shape optimization of vehicle by vehicle-air interaction study. Vehicle stability. Mathematical models used. Vehicle stability analysis. Maniabilitatea vehicles: maniabilității study, criteria for assessing the maniabilității. Using mathematical analysis software stability and maniabilității vehicles. Study maniabilității stability and computational simulation of vehicles through their movement.

TEACHING LANGUAGE: Romanian

EVALUATION: Written examination

BIBLIOGRAPHY (selective):

Cîmpian V., Bolcu D., Neagoe D., Autoturismul virtual realizat cu ajutorul programului ADAMS/CAR utilizat pentru analiza comportamentului dinamic, A VIII A Conferință Internațională de Autovehicule Rutiere, Pitești, 2000;

Legois T., Modelisation et analyse de la dynamique du szstem vehicule-pilot, Ingenieurs de l'Automobile, oct 1987, p. 101-106

Oțăt V., Bolcu D., Simniceanu L., Dinamica autovehiculelor, Editura Universitaria Craiova, 2005; Simniceanu L., Aplicații ale teoriei sistemelor dinamice în dinamica automobilelor, Teza de doctorat, Universitatea Politehnica București, 2005; Neagoe D., Cercetări teoretice și experimentale privind studiul stabilității și maniabilității la autoturismele de fabricație românească în vederea îmbunătățirii acestora, Teză de doctorat, Universitatea Transilvania Brașov, 2000

Simniceanu L., Elemente avansate de dinamica autovehiculelor rutiere, suport curs.

Finite Element Analysis for Design Engineers, KUROWSKI, PAUL M, 2004, SAE International Elemente avansate de dinamica autovehiculelor rutiere – Îndrumar de laborator, Simniceanu L., Trotea M., 2012, pentru uz didactic

Proiectarea asistată de calculator în Matlab și Simulink: Conducerea avansată a proceselor / SOARE, CĂLIN .- 2006, București : Agir Introducere în studiul dinamicii sistemelor, SIMION FLORIAN PAUL, 2003, București : Matrix Rom Automotive Vehicle Safety, PETERS, GEORGE A., 2002, Society of Automotive Engineers

Subject of study: Modern systems for maintenance of the road vehicle

CODE: D22CPAM105

Number of credits: 4

Year/Semester: 1st year , 1st semester

Type of Course: optional

Objectives: The course offers the students theoretical and practical concepts regarding training of original thinking in the field of the energies engineering, used as heat source.

Content: Interdependenc e Quality – Reliability; Reliability of products; Maintainability and availability of elements and technical systems; Predictive evaluation and optimization methods of maintainability. Maintenance strategy

Teaching Leanguage: Romanian

Evaluation: written/ oral examination

Bibliography:

Băjenescu, T. – Fiabilitatea sistemelor tehnice, Editura MatrixRom, București, 2003;

Ene, V. Bazele teoretice ale exploatării tehnice și reparației automobilelor. Disponibilitate. Fiabilitate, Universitatea Tehnică a Moldovei, Chișinău, 2005; Gîrlașu, Șt., Gillich, N. - *Fiabilitatea sistemelor*. Universitatea „Eftimie Murgu”, Reșița, 1995.

Ghionea, F, Ghionea A. – Fiabilitate si aspecte conexe în transporturi, Editura MatrixRom, București, 2011;

Manea C., Stratulat M. „Fiabilitatea și diagnosticarea automobilelor”, Editura Militară, București, 1982;

Panaite Valerie, Popescu Mihai Octavian „Calitatea produselor și fiabilitate”, Editura MATRIX-ROM, București, 2003;

Pisoschi Al.-Gr., Oțăt Victor, Dumitru Ilie. „Terotehnica și fiabilitatea autovehiculelor”, Reprografia Universității din Craiova, 1998;

Pisoschi, Al.-Gr., Popa, Gh., Constantinescu, A.-Elemente de durabilitate, fiabilitate și mentanabilitate, Editura Universitaria, Craiova, 2006;

Postavaru, N.: Managementul calității totale. Ed. Universitatea Tehnica de Constructii Bucuresti, 2006

Spiroi, M. – Fiabilitatea si mentenanta vehiculelor feroviare, Editura MatrixRom, București, 2006;

Stoian, C., Frumușanu, G. – *Fiabilitatea și mentenanța utilajelor*. Editura Cartea universitară, București, 2005.

Tarău, I., Stancu, V., Georgescu, C. - *Calitate și fiabilitate*. Editura Fundației Universitare „Dunărea de Jos”, Galați, 2001.

Subject of study: Not including motor vehicle diagnostics

CODE: D22CPAM106

NUMBER OF CREDITS: 4

YEAR/SEMESTER: 1st year/ 1st semester

TYPE OF COURSE: optional

OBJECTIVES: The course provides the students with the specific notions of this discipline aiming further at their application in the design of vehicle's structural components and explaining moreover advanced methods and techniques and advanced onboard and laboratory diagnostics.

CONTENT: General principles of diagnosis vehicles. General diagnosis of motor vehicles. Main vehicle diagnostics systems. Modern diagnostic elements. Self-diagnosis and diagnosis of board (on board diagnose) - Equipment and method. Laboratory diagnosis - service (off board diagnose) - Equipment and method.

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

- 1.Andreescu, C., ș.a. Diagnosticarea automobilelor, Editura Printech, București, 2002
- 2.Cristea, D., Sisteme speciale ale automobilelor și motoarelor, Editura Universității din Pitești, 1999
- 3.Dumitru I., Diagnosticarea sistemelor tehnice, Editura Universitaria, Craiova, 2005
- 4.Grunwald, B., Teoria, construcția și calculul motoarelor pentru autovehicule rutiere, Editura Didactică și Pedagogică, București, 1982
- 5.Manea, C., Stratulat, M., Fiabilitatea și diagnosticarea automobilelor, Editura Militară, București, 1982
- 6.Oțăt, V., Dumitru, I., Echipamente și tehnici de diagnosticare a autovehiculelor, Editura Universitaria, 2007.

Subject of study: Researches basics

CODE: D22CPAM107

Number of credits: 4

Year/Semester: 1st year , 1st semester

Type of Course: mandatory

Objectives: Presentation of the basic principles of the various methods and means of measuring the quantities that characterize the technological processes

Content: Measurement basics. Measuring systems. Parametric and Generators transducers. Electrical Tensometry. Fotoelasticimetria. Experimental Measurement of stress and deformations. Circuits for the transducers connecting. Statistical processing of experimental data. Methods of measuring displacements. Speed measurement methods. Methods of measuring forces, moments, power, temperature, pressure. Methods and principles for measuring surface roughness. Vibration measurement methods in mechanical systems

Teaching Leanguage: Romanian

Evaluation: written/ oral examination

Bibliography:

- Apostolescu, N., Taraza, D., Bazele cercetării experimentale a mașinilor termice, E.D.P., București, 1979.
- Balaban, C., Strategia experimentării și analiza datelor experimentale. Aplicații în chimie, inginerie chimică, tehnologie chimică, Editura Academiei Române, București, 1993.
- Ciocîrdia, C., Ungureanu, I., Bazele cercetării experimentale în tehnologia construcțiilor de mașini, E.D.P., București, 1979.

Ciolacu Filip Gabriel, Nicolae Crăciunoiu, Adrian Sorin Roșca, Principii și metode de măsurare, Editura Universitaria, 2002.

Ciolacu, F.,G., Mazilu, Pogorschi, C.,L., Bazele cercetării experimentale. Îndrumar de laborator, Reprografia Universității din Craiova, 1997.

Ciolacu, F.,G., Pogorschi, C.,L., Bazele cercetării experimentale. Curs, Reprografia Universității din Craiova, 1996.

Ciolacu, F.,G., Traductoare și aparate de măsură, Reprografia Universității din Craiova, 2000.

Ciolacu, F.,G., Traductoare și captoare pentru mărimi mecanice, Editura Universitaria, Craiova, 1999.

Ciolacu, F.,G., Traductoare și captoare pentru mărimi mecanice, Editura Universitaria, Craiova, 1999.

Constantinescu, I.N., Măsurarea mărimilor mecanice cu ajutorul tensometriei, Editura Tehnică, București, 1989.

David L, I. Păunescu, Bazele cercetării experimentale a sistemelor biotehnice, București, 1999.

Dușe D. M., N. F. Cofaru, Bazele cercetării experimentale, Sibiu, 2001.

Lupea I., Măsurători de vibrații și zgomote prin programare cu LabView, Cluj Napoca, 2005.Pisoschi Alexandru-Grigore, Tribologia si fiabilitatea utilajelor agricole, Editura Universitaria, 2002.

Stanimir A., Îndrumar de laborator, Editura Sitech, Craiova, 2014.

Tripa Pavel, Faur Nicolae, Metode teoretice și experimentale pentru determinarea stării de tensiune și deformație, Universitatea Tehnică Timișoara, 1994.

Tripa Pavel, Metode experimentale pentru determinarea deformațiilor și tensiunilor mecanice, Editura MIRTON, Timișoara, 2010.

Subject of study: Ethics and academics integrity

CODE: D22CPAM108

Number of credits: 4

Year/Semester: 1st year , 1st semester

Type of Course: mandatory

Subject of study: Scientific research/practice

CODE: D22CPAM109

Number of credits: 5

Year/Semester: 1st year , 1st semester

Type of Course: mandatory

OBJECTIVES: Developing specific study program abilities by identifying the fundamental and documentary elements related to the analysis of technical norms and research in the field

CONTENT: Scientific research: defining the theoretical, applied, experimental and analytical elements. Classical and modern bibliographic research techniques on a given theme. Drawing up a bibliography; references and footnotes. Choosing the field of research and proposing a theme. Establish the main objectives within the activity. Documentation on the fundamentals of the research-design field chosen. Search engines specific to scientific research. Identifying important achievements, defining the proposed themes.

Scientific report resulting from bibliographic research on a given topic; summary and keywords that characterize the theme; content of ideas, critical analysis, personal opinions, conclusions. Presentation of scientific articles: elaboration of the presentation of the article; estimating the length of the presentation according to the time limits; designing the presentation form; preparation of the presentation

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

Belous, V., Plăteanu, B. Fundamentele creației tehnice. Editura Performantica, Iași, 2005

Enăchescu, C. Tratat de teoria cercetării științifice, Editura Polirom, Iași, 2005

Manolea, Gh. Bazele cercetării creative, Editura AGIR, București 2006

Subject of study: Advanced design of support bearing structures for road vehicles

CODE: D22CPAM210

NUMBER OF CREDITS: 6

YEAR/SEMESTER: 1st year/2nd semester

TYPE OF COURSE: mandatory

OBJECTIVES: Knowledge of computing elements and aspects of design and Structures vehicle bodies. Defining the fundamental structural and constructive elementary surfaces supporting structure. Correlating static and dynamic load bearing structure analysis using special programs

CONTENT: Economic and technical analysis of modern automobiles constructive solutions. Interior design, optimize volumes and establish fundamental structural lines. Technical design and aerodynamic shape of a car. Solution Structures and structural elements of the body. Elements of calculating the bearing structure. Getting elasticity theory to calculate bearing structures by finite element method. Assessment of impact behavior of automotive Structures

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

CORBEL, J.C. - Le rôle de l'aérodynamicien dans le déroulement d'une étude de style. în revista "Ingénieurs de l'Automobile", nr. 7-8/1985, pag. 92-94, SIA, Paris.

IVAȘCU, A., PREDA, M., ȚUICĂ, A., „Îndrumar pentru proiectarea caroseriilor auto”, Tipografia Universității din Craiova, 2002

SANDU, M. și SOBEC, M. - Considerații privind elaborarea modelelor de calcul pentru verificarea la rezistență a caroseriilor de autovehicul, utilizând metoda elementelor finite. ESFA, 1984, I.P. București, voi. II, pag. 175-179.

ROȘCA, R., „Caroserii și Structuri Portante”, Editura Odeon, Vaslui, 1999

*** - Prescripțiile unor standarde internaționale în domeniul auto (ISO, ECE/ ONU-Geneva, CEE/ Piața Comună-Bruxelles etc.).

*** - Prescripțiile unor standarde naționale în domeniul auto (STAS-România, SAE-S.U.A., BNA-Franța, DIN- Germania, FMVSS-S.U.A., CMVSS-Canada, KS-Coreea de Sud etc.).

*** - Standarde de firmă (Daewoo, Citroen, Peugeot, Opel, Renault etc.).

Automotive Engineering SAE International, 1998-2007

Subject of study: Modern testing and calibration of road vehicles

CODE: D22CPAM211

NUMBER OF CREDITS: 5

YEAR/SEMESTER: 1st year/ 2nd semester - Master

TYPE OF COURSE: mandatory

OBJECTIVES: This course provides the students with the specific knowledge and the appropriate use of specific fundamental concepts of the discipline, and explaining moreover specific methods and techniques as well as advanced calibration tests upon vehicles, aiming thus at acquiring advanced knowledge in the field of vehicle testing.

CONTENT: Qualitative evaluation experiments and calculation errors. Electronic measuring of non-electrical quantities. Choosing and preparing vehicles for testing. Attempting vehicle handling and stability. Sources of vibration in a vehicle. Indices for assessing the quality automotive suspension. Trying sealing body. Considerations on the calibration concept vehicle. Engine calibration. Fuel calibration. Establishing specific calibration methodology vehicles. Calibration equipment necessary for vehicles

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

1. Cîmpian, V., „Aparat spațiu-viteză-timp” Universitatea din Brașov, 1976

2. Gafițenu, M., ș. a. „Vibrații și zgomote”, Editura „Junimea” Iași, 1980

3. Hilohi, C., Untaru, M., „Metode și mijloace de încercare a automobilelor”, Ed. Tehnică, 1982;

4. Negruș, E., ș.a. „Tester mobil pentru încercarea complexă a anvelopelor în condiții de drum”, I.P.B. București, 1979

5. Negruș, E., ș.a. „Încercarea autovehiculelor”, E.D.P. București, 1983.

6. Oțăt, V., Simniceanu, L., „Încercarea autovehiculelor”, Ed. Universitaria, Craiova, 2004;

7. Oțăt, V., Bolcu, D., Thierheimer, W., Simniceanu, L., „Dinamica autovehiculelor”, Ed. Universitaria, Craiova, 2005 ;

8. Stratulat, ș.a., „Diagnosticarea automobilelor”, Editura Militară București, 1990.

Politehnic București, 1979;

9. Popa, S., Hilohi, C., „Încercarea autovehiculelor” Ed. Tehnică, București, 1972.

Subject of study: Modern technologies to manufacture and repair of road vehicles

CODE: D22CPAM212

NUMBER OF CREDITS: 5

YEAR/SEMESTER: 1st year/2nd semester

TYPE OF COURSE: mandatory

OBJECTIVES: Deepening modern to manufacture and repair methodologies of the vehicle.

CONTENT: Generalities about the repair process. Determination of the necessary elements to reach the technological repair processes Advanced materials for repair process. Actual tendencies for

materials and their manufacture. Ni based superalloys . Multifunctional materials with low density. Metallic materials, „Metallic foam”, type, extremely light, multiple uses. Structural and functional materials, Bio-metals (Ni-based implants). Abrasive materials. Modern methods for reconditioning of the vehicle components, Advanced technologies for shaft, bushing , pistons etc. reconditioning.

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

Crivac, Gh., Tica B, ș.a. -Tehnologii de fabricare a autovehiculelor. Ed. Universității din Pitești, 2002
 Marinceaș, D., Abaitancei, D-Fabricarea și repararea industrială a autovehiculelor rutiere. Editura didactică și pedagogică, București 1982
 Nicolae, V., Crivac, Gh., Ilie, S. - Fabricarea și repararea industrială a autovehiculelor, Ed. Universității din Pitești, 2001.
 Tică, B. -Tehnologia reparațiilor și recondiționărilor. Reprografia Universității din Craiova, 1997
 Tică, B. – Fabricarea și repararea industrială a autovehiculelor. Editura Universitaria Craiova, 2008

Constructive and functional optimization of vehicle engines

CODE: D22CPAM213

NUMBER OF CREDITS: 7

YEAR/SEMESTER: 1st year/2nd semester

TYPE OF COURSE: specialized

OBJECTIVES: Assimilation by learners of: notions specific to components and internal combustion engines operation; notions specific to the thermal processes and internal combustion engines characteristics. Formation of the aptitudes necessary to determinate parameters and indices which characterize thermal processes and interpretation of engines characteristics. Formation of skills concerning engines design in terms of thermal processes and characteristics.

CONTENT: Considerations regarding experimental research in internal combustion engines field. Modern elements of investigation, modeling and validation of thermal motors real processes. Fuel consumption reduction strategies. Modern methods of mixture formation and combustion. Variable distribution. M.a.s. modernization- courses of action. Compressing ignition engine modernization. Considerations regarding systems theory in control applications of engines intelligent management and engines control by fuzzy logic. Propulsion alternative solutions.

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

Bobescu, Gh., ș.a., Motoare pentru automobile și tractoare, Volumul I, Teorie și caracteristici, Editura Tehnică, Chișinău, 1996;
 Challen, B., Baranescu Rodica, Diesel Engine Reference Book, Butterworth Heinemann, 1999;
 Cristea, D., Cai de optimizare a motoarelor cu ardere internă, Editura Universității din Pitești, 2009;
 Dumitru I., Procese și caracteristici ale motoarelor cu ardere internă, Craiova, 2009;

Dumitru I., Procese și caracteristici. Indrumar de laborator, Craiova, 2009;

Dumitru, I., Motoare pentru automobile și tractoare. Metode moderne de optimizare a parametrilor energetici ai motoarelor Diesel cu injecție directă, Editura Universitaria, ISBN: 973-8043-85-9, Craiova, 192pg, 2008;

Grunwald, B., Teoria, calculul și construcția motoarelor pentru autovehicule rutiere, editura Didactică și Pedagogică, București, 1980;

Negurescu, N., s.a., Motoare cu aprindere prin scanteie. Procese, Editura MatrixRom, Bucuresti, 2009;

Pulkrabek, W., Engineering Fundamentals of the Internal Combustion Engine, Prentice Hall, New Jersey, 2002;

Negrea, V., D., Bazele cercetării experimentale a motoarelor cu ardere internă și a autovehiculelor rutiere, volumul 1 și 2, Editura Eurostampa, Timisoara, 2005;

Oprean, I., M., Automobilul modern, Editura Academiei Romane, Bucuresti, 2003;

Rakosi, E., Rosca, R., Manolache, Gh, Ghid de proiectare a motoarelor cu ardere internă pentru automobile;

***** STAS 5745-91, Motoare cu ardere internă, cu piston cu mișcare alternativă;

Subject of study: Scientific research/practice

CODE: D22CPAM214

Number of credits: 7

Year/Semester: 1st year , 2nd semester

Type of Course: mandatory

Second year of study:

Subject of study: Constructive optimization of the transmissions and vehicles systems

CODE: D22CPAM321

NUMBER OF CREDITS: 5

YEAR/SEMESTER: 2nd year/1st semester

TYPE OF COURSE: mandatory

OBJECTIVES: Increasing knowledge on modern vehicles transmissions required in design and research, acquiring calculation methods, modeling and design optimization for transmission vehicle's elements.

CONTENT: Introduction to optimization theory; Classical methods for optimum determination (problems with and without restrictions). Direct search methods for the optimal solution. Programming methods. Topological optimisation. Constructive optimisation for the mechanical clutch, mechanical gearbox, planetary shaft, suspension system, steering system and brake system.

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

Curievici, I., Optimizări în industria chimică, Editura Didactică și Pedagogică, București, 1980

Radulescu, O., Popovici, M.M., Proiectarea optimă a organelor de mașini. Teorie și aplicații., Editura Tehnică, 2003

Trotea, M., Simniceanu, L., "Optimizarea constructivă a sistemelor autovehiculelor – lucrări practice", 2013

Trotea, M., "Optimizarea constructivă a transmisiei și a sistemelor autovehiculelor. Note de curs", 2014

Trotea, M., "Optimizarea constructivă a transmisiei autovehiculelor. Lucrări practice", 2015

Subject of study: Modern electric and electronics systems for road vehicles

CODE: D22CPAM322

NUMBER OF CREDITS: 5

YEAR/SEMESTER: 2nd year/1st semester

TYPE OF COURSE: mandatory

OBJECTIVES: Student training in the field of modern electronic systems for road vehicles

CONTENT: Devices and electronic circuits used in road vehicles; Electronics equipment for engine control: Spark ignition engine control; Diesel engine control; Electronics equipment for transmission control; Control of automatic transmission; Suspension control; Steering system control with servomotor. Electronic equipment for control and measurement of the system control: Complex electronic measuring system. Electronic equipments for control of auxiliary systems: door lock control; Windscreen wiper control.

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

Goșea, I., Sisteme electronice moderne pentru autovehicule. Editura SCRISUL ROMÂNESC, Craiova, 2000.

Goșea, I., Echipamente electronice pentru autovehicule rutiere. Editura SECOLUL XXI, Craiova, 1998.

Goșea, I., Sisteme electronice de aprindere și injecție pentru automobile. Îndrumar de laborator. Reprografia Universității din Craiova, 2001

Subject of study: Quality engineering

CODE: D22CPAM323

NUMBER OF CREDITS: 4

YEAR/SEMESTER: 2nd year/1st semester

TYPE OF COURSE: mandatory

Subject of study: Analysis of vehicles vibration

CODE: D22CPAM324

NUMBER OF CREDITS: 4

YEAR/SEMESTER: 2nd year/1st semester

TYPE OF COURSE: mandatory

Subject of study: The ergonomics of the driver-vehicle system

CODE: D22CPAM325

NUMBER OF CREDITS: 4

YEAR/SEMESTER: 2nd year/1st semester

TYPE OF COURSE: optional

OBJECTIVES: Acquiring basic notions about noise and vibrations occurring in motor vehicles, forming general skills to use information provided by noise for technical defects, The discipline aims to get students familiarized with basic concepts of ergonomics and with specific design and ergonomic organization of vehicles and their effects on the automobile driver.

CONTENT: Characteristics of noise and vibration. Definitions, classifications. Sound level, decibel. Effects of wind and temperature on noise propagation. Reflection, refraction and diffraction of sound. Physiological features of sound. Effects of noise and vibrations on the body and human activity. Hearing and extra-auditory effects. Vibration assessment criteria. Definition and principles of ergonomics; Organizing of the interior of the vehicle. Additional systems that enhance driving position ergonomics. Mathematical models for vehicle vibration study. Linear links. Model with one degree of freedom to study vehicle vibration. Vibrations of the suspended mass produced by the harmonics of the tread. Sound-absorbing and sound-absorbing materials. Porous absorbers with rigid or flexible skeleton. Simple and grouped resonators absorbers type. Vibrating membranes. Compound structures. Vibration reduction methods for motor vehicles. Metallic springs. Vibro-insulating rubber parts. Vibro-isolation elements of hard polyurethane. Vibroinsulating elements of wire mesh. Vibro-insulating pneumatic elements. Vibration measurement transducers. Parametric transducers (capacitive, electromagnetic, resistive). Noise transducers. Piezoelectric microphones. Condenser microphones. Ergonomic design of vehicles. Ergonomic organization of vehicle cabin.

TEACHING LANGUAGE: Romanian

EVALUATION: Written/oral examination

BIBLIOGRAPHY (selective):

Darabont A., Iorga I., Ciodaru M., -Masurarea zgomotului si vibratiilor in tehnica, Editura Tehnica Bucuresti, 1983
 Darabont A., Costin A., Vaiteanu D., -Combaterea zgomotului si vibratiilor in tehnica militara, Editura militara, Bucuresti, 1983
 Filip N., -Zgomotul la autovehicule, Editura Toderescu, Cluj Napoca, 2000
 Filip N., Cordos N., Rus I., -Zgomotul urban si traficul rutier, Toderescu, Cluj Napoca, 2001
 SR ISO 9613-1. Acustica. Atenuarea sunetului propagat in aer liber
 Hotararea Guvernului 321/2005 (Directiva 2002/49/EC)
 Bolcu D.- Vibratiile sistemelor cu legaturi liniare, Ed. Sitech, Craiova, 2006

Subject of study: Analysis and reconstruction of the traffic accident

CODE: D22CPAM326

NUMBER OF CREDITS: 5

YEAR/SEMESTER: 2nd year/1st semester

TYPE OF COURSE: mandatory

OBJECTIVES: Learning by students of the elements specific to the road traffic accident analysis; Developing the skills required to reconstruct a traffic accident.

CONTENT: Basic problems of the traffic accident reconstruction; Identification and taking of the traces for traffic accident expertise; Ways to reconstruction of the Kinematics and dynamics sizes of the vehicles involve in traffic accidents; Human factor and traffic accident; Pedestrian accident expertise; Modeling and simulation in the reconstruction of traffic accidents

Teaching Language: Romanian

Evaluation: written/ oral examination

Bibliography:

Dumitru I., Analiza și reconstrucția accidentelor de circulație, Note de curs, 2016
 Dumitru I., Oțăt Oana, Oțăt V., Analiza și reconstrucția accidentelor de circulație. Elemente aplicative, 2017
 Gaiginschi Radu. – Expertiza tehnică a accidentelor rutiere – Editura Tehnică, București, 2002.
 Gaiginschi Radu – Reconstrucția și expertiza accidentelor rutiere, Editura Tehnica, Bucuresti, 2009;
 Gaiginschi Radu s.a – Siguranța circulației rutiere vol.II, Editura Tehnica, Bucuresti, 2006;
 Hohn, M. – Decizia la conducătorii auto (o abordare psihologică), Ed. Multimedia, Arad, 1999;
 Mitchell, J., F. – International Guide Book For Traffic Accident Reconstruction – ACTAR, Canada, 2002;
 Nistor Neculai, s.a. – Expertiza tehnică a accidentului de circulație, Ed Militara, Bucuresti, 1987;
 Oțăt, Oana, Dumitru, I., Oțăt, V., Expertiza Tehnică a Accidentului de Circulație – Aplicații, Universitatea din Craiova, 2014
 Rothengatter, T., & Carbonell Vaya, E. (coord.) – Traffic and transport psychology, Pergamon, 1997;
 *** Accident Reconstruction – Technology And Animation - VI -SAE SP-1150 –1996.

*** Datentechik, S – PC-CRASH A Simulation Program for Vehicle Accidents, Operating Manual, Version 8.0 - November 2006, Linz, Austria.

*** Traffic Engineering Handbook, Institute of Transportation Engineers (1992). Washington, DC.;

*** Virtual CRASH 2.2 Documentation

*** <http://www.esafetysupport.org>,
<http://www.makeroadssafe.org>, <http://www.inrets.fr>

*** <http://www.vcrash.com/download/models&shapes.pdf>

Subject of study: Scientific research/practice

CODE: D22CPAM327

Number of credits: 7

Year/Semester: 2nd year, 1st semester

Type of Course: mandatory

Subject of study: Scientific research

CODE: D22CPAM428

Number of credits: 10

Year/Semester: 2nd year, 2nd semester

Type of Course: mandatory

Subject of study: Practical stage for dissertation preparing

CODE: D22CPAM429

Number of credits: 20

Year/Semester: 2nd year, 2nd semester

Type of Course: mandatory

Subject of study: Supporting of dissertation thesis

CODE: D22CPAM430

Number of credits: 10

Year/Semester: 2nd year, 2nd semester

Type of Course: mandatory