

## **ABSTRACTS**

OCTOBER RESEARCH CONFERENCE IN SILISTRA

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**UNIVERSITIES WITHOUT WALLS  
WITHIN THE VISION FOR HIGHER EDUCATION IN EUROPE BY 2030  
AND THE VISION OF THE UNIVERSITY OF RUSE**

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***Abstract:** The article outlines the University as an educational institution, a driving force that transforms human societies into "societies of knowledge" - a fact that determines their new vision for the future.*

*The prerequisites for the necessary changes are presented in detail; the trends that determine it and the main characteristics of the Universities in 2030. The events, achievements and goals that present the University of Ruse as a university of the "fourth generation without walls" are outlined.*

***Keywords:** university, future, trends, innovations, integration, cooperation, open, transnational*

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**ALEGEREA ȘI APLICAREA STRATEGIILOR DIDACTICE ÎN  
PROCESUL DE PREDARE-ÎNVĂȚARE AL LRLS**

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**Abstract:** *It is well known that the success of a foreign language course, in our case of Romanian as a foreign language, is largely due to the teaching methods and strategies used by the teacher in the classroom. In this sense, in the paper entitled Choosing and applying teaching strategies in the teaching-learning process of RLSL we aim to analyze some of the teaching strategies we consider to be the most appropriate for students to succeed in mastering and in the shortest possible time the knowledge of RLSL. We will also focus on the criteria for selecting these teaching-learning methods and how to apply them, depending on the level of student groups, starting from language level A1 (beginners) and going to C2 (advanced) and the proposed didactic aim.*

**Keywords:** *Romanian, foreign language, foreign students, teaching methods, knowledge*

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## CONTEMPORARY APPROACHES FOR DEVELOPING STUDENTS ' COMMUNICATIVE SKILLS

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**Abstract:** *Physical education and sports in Bulgaria are built on European values and at the same time have their own model and ways to acquire information, knowledge, motor habits and values. Modern educational requirements for the learning process cannot be realized using traditional methods. . The application of interactive approaches to training ensures effective transfer of theory in practice and high reliability in the planning and implementation of any motor activity in training. These are techniques, tools and methods aimed at integrative problem solving related to the development of students' communication skills and their formation as individuals. The development indicates a methodology for their application in a lesson in physical education and sports in primary school.*

**Keywords:** *physical education and sports, interactive methods, motor skills, communication skills.*

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## PSYCHOLOGICAL PROBLEMS WHEN SAFEGUARDING A PERSON IN EXTREME SITUATIONS

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**Abstract:** An unexpected “encounter” during a tourist trip with an arisen emergency and the specific difficulty that goes along with it in the situation usually increases the mental tension people feel. When the danger is too high and cannot be overcome with one’s own powers, various mental anxieties and psychological problems arise. The mental processes within a person (emotional experiences, working out a tactical plan, decision making, taking action, etc.) and mental state (crisis, crying, convulsions, breakdown, stupor, frustration, hysteria, and apathy) are connected with a specific personal tension, which requires safeguarding of the person. Then the emergency situation requires the help of others who need to provide psychological first aid. This requires the tour guide to remain calm and focused and be able to divide his attention appropriately, to adapt to the dangerous situation and maintain consideration and safety in the actions they take. Higher difficulty requires better personal organisation skills, as well as, various professional skills.

**Keywords:** extreme situation, tour guide, victim, mental state, crisis, cry, convulsions, breakdown, stupor, frustration, hysteria, apathy.

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## FLEXIBLE TEACHING METHODS – THE EDU SCRUM METHODOLOGY

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**Abstract:** *The purpose of this article is to report on the process of implementation of the eduscrum methodology in the practical classes of students-future teachers majoring in Pedagogy of teaching Bulgarian writing and foreign language at the Silistra Branch of the University of Ruse.*

*Scrum has been used worldwide extensively and applied across various use cases including but not limited to: research and identify markets, technologies, and product capabilities; develop and release products and enhancements as frequently as many times per day; maintain and sustain products, systems, and other operational environments.*

*EduScrum is a collaborative learning strategy and an effective framework for managing group projects that improves learner engagement and the development of thinking that aims at continuous improvement.*

*The text presents the results obtained during the first 18 months of the application of the methodology and the main competencies developed by the teachers whilst using eduScrum.*

**Keywords:** Active Learning; Engineering Education; Student engagement; eduScrum.

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## STRESS IN EXTREME SITUATIONS AND PROVIDING PSYCHOLOGICAL FIRST AID BY THE TOUR GUIDE TO THE INJURED

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**Abstract:** In extreme psychology stress, as a mental state, is looked at and explained since it is widely spread as an experience. Experiencing stress by an individual, caused by an unexpected extreme situation during a tourist trip (excursion) shows their initial behaviour and reactions, which necessitates psychological first aid provided by a non-professional at the site of the disaster. Previous psychological training in academic environment or additional qualification for providing psychological first aid to victims, experiencing stress in extreme situations is of substantial importance for the professional competency of the tour guide in tourism.

**Keywords:** extreme situation, tour guide, excursion, stress, stressors, psychological first aid, adaptation, traumatic stress.

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## SPECIFIC METHODOLOGICAL COMPETENCES OF LECTURES AT CENTRES FOR CONTINUOUS EDUCATION

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**Abstract:** *Abstract: The paper reviews existing efforts aimed at creating attractive and flexible opportunities for the acquisition of basic skills, new competencies, qualifications and retraining in the formal education system and in non-formal learning, as well as creating conditions for informal learning. The main goal of the training at the Centre for Continuing Education is not measured simply by its successful completion, but by supporting the acquisition of suitability for pedagogical professional employment through the quality of the provided educational services according to the needs of the trainees. Under “suitability for pedagogical employment” it is understood the acquisition of useful knowledge, skills, attitudes and habits for increasing the professional suitability and motivation for teaching by the trainees. The specific methodological tools involved in education, training, retraining, and qualification of adults encourage, support and develop an individual pathway for retraining and lifelong learning*

**Keywords:** Continuous education, methodology of teaching, adult learners, competences.

**JEL Code:** I29

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## SIGNIFICANCE OF PSYCHOLOGICAL FIRST AID PROVIDED BY THE TOUR GUIDE IN THE PRESENCE OF THE MENTAL STATES OF FEAR AND PANIC IN EXTREME SITUATIONS

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**Abstract:** In the many different unexpected extreme situations, various psychological personal problems and mental states arise, which hinder survival and overcoming the arisen difficulties in an extreme situation. Fear and panic accompany a person's life as a main psycho-emotional thread under extreme conditions. This text looks into the significance of the tour guide's knowledge when providing psychological first aid in the presence of the mental states of fear and panic in extreme situations.

**Keywords:** extreme situation, danger, mental state, fear, panic, tour guide.

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## ONLINE TESTING CHALLENGES FOR LECTURERS AND STUDENTS

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**Abstract.** The new situation worldwide raised a lot of questions concerning not only teaching ESP in the virtual environment but testing students online as well. Workshop and forum discussions pointed out that the biggest challenge for both lecturers and students turned out to be online testing. The report tackles some issues related to online testing at Nikola Vaptsarov Naval Academy - Varna, Bulgaria. Summaries and conclusions are made from the current situation and some ideas are presented for further development of the online English tests on the basis of the results obtained.

**Keywords:** ESP, virtual environment, online testing challenges, development of online tests

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## PROJECT-BASED EDUCATION AND FOREIGN LANGUAGE LEARNING

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**Abstract:** The article discusses the application of project-based learning within the discipline "Pedagogy for teaching in Bulgarian and English" at the University of Ruse, Silistra Branch. In the beginning, it analyses three factors that require the application of such a tool, namely: firstly, the recommendations of the European reference framework of key competencies; secondly, the need to develop intercultural competence among students, who would work as secondary teachers in multicultural environment and thirdly, the rapidly and widely growing trend of tailoring the education towards students' needs. On this basis, the article draws conclusions and suggests a model of project-based learning, which improves the development of key competencies and is oriented towards achieving learning outcomes in various disciplines in the discipline "Pedagogy for teaching in Bulgarian and English. language".

**Keywords:** Model, Project-Based Learning, Key Competences, 6-Phase Project Development.

**JEL Codes:** L10, L11

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## METHODOLOGY FOR EVENT PROJECT MANAGEMENT TRAINING

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**Abstract:** The paper presents a methodology for education in event project management that was introduced for students attending International Staff Week at VIVES – Commercial Sciences, Business Management and Informatics in Kortrijk, Belgium in 2019 and 2021. Students are second year bachelor students in office and business management and informatics. Training aims to provide students with basic knowledge answering the question “What is project management and how it can be applied in organizing events?” and is structured in two parts – theoretical introductory seminar and case study/assignment for teamwork. The training aims to provide basic knowledge in project management and to tie down this knowledge with events organization and marketing. Also it aims to provide students with practical skills in main project preparation elements – scope and results definition, description of activities, timing and scheduling, resources planning, calculation of budget and scheduling of expenses.

**Keywords:** events management, project management, event project management, methodology of training

**JEL Codes:** A2, O10, G14

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**FRI-ONLINE-LTLHP(S)**

**FRI-ONLINE-LTLHP(S)-01**

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**BULGARIAN SCIENTISTS AND BULGARIAN NATIONAL COMMUNITY  
IN JOINT INSTITUTE FOR NUCLEAR RESEARCHES.**

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**Abstract:** *The issue is dedicated to the activity of Bulgaria as participant of international intergovernmental research centre – Joint Institute for Nuclear Researches (JINR). It was founded in 1956 as a special space, where scientists' cooperation leads to co-influence and penetration of different cultures. This successful experience of collaborating appeared since Soviet period and is lasting up to nowadays.*

*Bulgaria as a state-member of JINR since the moment of foundation was (and is) an active participant of the process of development of JINR. Bulgarian physicists: academician Ch. Christov, academician G. Nadzhakov, professor I. Zlatev, professor Tz. Vylov, professor Pl. Fiziev played an important role in the researchers in sphere of nuclear physics. They made a number of important discoveries, held the high positions in scientific and administrative management of the Institute. The essay also contains the information on the scientific achievements of the Bulgarians, and peculiarities of their everyday life and work in Dubna and in JINR. Special attention is focused on the communication of scientists in their spare-time and on the intercultural dialogue between foreigners. The idea to join and coordinate the efforts and resources of various countries in the field of fundamental researches was new and challengefull at the middle of XX cent. This year JINR celebrates 65<sup>th</sup> anniversary. Today, it is a phenomenal place, and valuable experience of cooperation on all the levels.*

**Keywords:** *scientific cooperation, intergovernmental research centre, discoveries, Bulgarian physicists, everyday life*

**JEL Codes:** 29

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## STYLISTICS OF RIGHTEOUSNESS IN A FOLK SONG FROM SILISTRA REGION<sup>1</sup>

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**Abstract:** The study of the concept of righteousness is a current issue given the fact that cognitive linguistics take a contemporary development with a scientific focus on more interdisciplinary problems. The subject of this report is the song "The orphan Stanka" from "A collection of folk songs, sang in the Silistra region villages" (1898). The main focus of the research is the role of the tropes and the figures of the feeling as the most frequent means of expression, representing the Bulgarian cognitive experience, refracted through the prism of Christianity. In this particular case the metaphor, metonymy, repetition and address are the predominant means of verbal imagery in the song. They play the role of stylistic markers, helping to get an insight into the mysterious meaning of the sacred books of the New Testament.

**Keywords:** Concept of righteousness, Stylistics, Cognitive linguistics, Metaphor, Metonymy, Repetition, Address

**JEL Codes:** L29

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## THE LANGUAGE USED BY IVAN N. MOMCHILOV IN HIS TRANSLATION OF SACRED TEXTS (GRAPHIC AND SPELLING FEATURES)

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**Abstract:** The report focuses on the language used in biblical texts and their translation into Bulgarian by the Bulgarian Revival teacher, writer and publisher Ivan N. Momchilov. The translations are included in the short story collection "Tsarkoven tsvetnik" ("Liturgical Anthology"), published by "Knigoprodavnitsa Momchilov & Co." in 1869. It is the only book by the outstanding Bulgarian Revival writer, printed entirely in Church Slavonic Cyrillic. The report examines the alphabet composition and how certain letters are used, offering a comparison between the Church Slavonic spelling rules and the set of linguistic norms and rules exemplified in Ivan N. Momchilov's book "Grammar for the New Bulgarian Language", printed in 1868 in Ruse.

**Keywords:** history of the contemporary Bulgarian literary language; slavic literary language; Ivan N. Momchilov; languagespelling model; dialect; literary tradition.

**JEL Codes:**

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## THE POLITICAL PURGE OF THE TEACHER'S SCHOOL IN SILISTRA AFTER 9 SEPTEMBER 1944

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**Abstract:** Education was one of the pillars of every democratic and civilized state, so immediately after the coup on September 9, 1944, the Communists aimed to master the educational sphere rather than "take over" it and "transform" it according to their socialist (Soviet) model. One of the first measures in this regard is repression, through the so-called people's court and the purge (turned into an annual action) of the teacher's school by all the thoughtful and dubious ("bourgeois"/"fascist") past teachers.

**Keywords:** teachers, cleansing, repression, education, Silistra

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**THE BULGARIAN VILLAGE OF LIPNITSA, NORTHERN DOBRUJA,  
AND ITS INHABITANTS DURING THE PERIOD 1822-18.11.1878  
(ACCORDING TO PUBLICATIONS AND ARCHIVAL DOCUMENTS)**

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**Abstract:** The article summarizes the information about the village of Lipnitsa and its inhabitants during the Renaissance until the passing of Northern Dobrudja under Romanian rule. The contribution is the inclusion of new documents from Bulgarian and Romanian archives.

**Keywords:** Keywords: Lipnitsa, Northern Dobrudja, Russo-Turkish War, Bulgarian Revival, Treaty of Berlin (1878)

**JEL Codes:** L29

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## FREEMASONRY, ITS EXISTENCE AND IMPACT ON THE SHORT STORY “MASTER TASSO” BY DOBRI NEMIROV

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**Abstract:** The report focuses on a vaguely studied topic in the history of Bulgarian literature – the existence and impact of Freemasonry on Bulgarian literary texts. It examines a specific literary work which is thematically relevant to Freemasonry – the short story “Master Tasso” by Dobri Nemirov (1882 – 1945). The writer was initiated into Freemasonry in 1924 in the Masonic Lodge “Zora” (“Dawn”) in Sofia which is one of the oldest and most powerful lodges in the Grand Lodge of Bulgaria. The short story is included in the collection “When I was Child”. The report clarifies the structure and themes of the short story “Master Tasso” where freemasons teach significant coded moral and ethical lessons through childhood memories descriptions.

**Key words:** Dobri Nemirov, Bulgarian literature in 20<sup>th</sup> century, a short story “Master Tasso”, Freemasonry, Masonic culture, literary impact.

**JEL Codes:**

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## ON SOME CHARACTERISTIC FEATURES OF THE INTONATION IN THE EASTERN-RHODOPIAN VISHNEVO DIALECT

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**Abstract:** The paper deals with an intonation feature of a Bulgarian dialect from the Eastern Rhodopes – the dialect of Vishnevo, Banite municipality, of Smolyan region. It is an *a*-dialect (Ж,А, Ъ, ъ → *a*) and contains many archaic features and innovations.

**Keywords:** Bulgarian language, Bulgarian dialects, Eastern Rhodopes, Vishnevo.

**JEL Codes:** L29

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## 10 FILMS FOR LAW STUDENTS

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**Abstract:** *My research is the result of an experiment I conducted last year with my second-year law students of Ovidius University of Constanta. Due to the pandemic period, we have all been confined to our homes and , somehow, forced to find new ways of teaching. Even though, I constantly use technology during my seminars, I thought I could widen the horizon of the learning process thus I asked my students to watch a series of films, most of which are Hollywood productions, so susceptible of being more commercial than profound, that were to be discussed whilst our online sessions. My selection is subjective, but, at the same time, by doing that, I have tried to cover topics such as gender discrimination, wrongful convictions, corruption, money laundering, theft, capital punishment. All these were treated as case studies and debated on to trigger extremely intriguing discussions, together with critical thinking that a future lawyer would be in desperate need of possessing. It was also a great opportunity for the learners in question to exercise their English, especially conversation, along with achieving professional law jargon, in other words, enriching vocabulary a lot.*

*The theoretical base of my research was offered by V. F. Perkins' volume "Films as films. Understanding and Judging Movies" and by Hutchinson and Alan Waters' "English for Specific Purposes. A learning-centered approach".*

*My paper aims at demonstrating that teachers should encourage such experiments, such comparisons and debates as they ready our students for real life situations as future specialists, not to mention the remarkable progress in using English they would reach having analyzed all the cases in question.*

**Keywords:** *critical thinking, law, case studies, discrimination, debate, speaking , English for specific purposes, law jargon*

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## THE LANGUAGE OF A MANUSCRIPT CONTRACT BY STOYAN ROBOVSKY, 1874

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**Abstract:** The report shows the linguistic peculiarities of a manuscript written by the Bulgarian Revival teacher and writer Stoyan Robovsky. It is a manuscript contract between Stoyan Robovsky and the members of the board of the school in Razgrad. The manuscript is kept by Veliko Tarnovo State Archives. The report examines the graphic, spelling, phonetic and grammatical features of the text.

**Keywords:** history of the contemporary Bulgarian literary language; slavic literary language; Stoyan Robovsky; Ivan N. Momchilov; languagespelling model; dialect; literary tradition.

**JEL Codes:**

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## **50 YEARS SINCE THE ESTABLISHMENT OF THE SEMI-HIGHER PEDAGOGICAL INSTITUTE IN SILISTRA**

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***Abstract:** The text presents the beginning of pedagogical education in Silistra, related to the establishment of the Pedagogical School. The various transformations of the institution caused by historical circumstances, are tracked over the years. They are a prerequisite for the opening of the Semi-Higher Pedagogical Institute in the city in 1971. Based on research of archival materials, information about the structure of the branch, as well as the educational, creative and sports activities in the institute during the first decade of its establishment is presented.*

***Keywords:** education, institution, transformations, beginning, archive, structure*

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## FOR THE SIMPLE SENTENCE WITH CIRCUMSTANT EXPLANATION OF THE DISCOUNT IN THE BULGARIAN LANGUAGE

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**Abstract:** The article presents the simple sentences with a secondary part adverbial modifier for retreat. The adverbial modifier is usually associated with those parts of the sentence that carry the meaning of "action / state", therefore it most often explains the verb predicate. The specific specialties of the simple sentences for retreat are reflected by tracing the changes that occur with them overtime. The use of simple sentences for retreat in the Old Bulgarian language is presented by the discovery of characteristic features and peculiarities.

There is also a place for the simple sentences in the modern Bulgarian language. A semantically - semantic characteristic of the simple sentences is presented, in which the adverbial modifier for retreat is expressed through verbal adverb. The specific features of the verbal adverb are revealed. The examples that are included in the study are extracted from texts of the Bulgarian fiction.

**Keywords:** syntax, Bulgarian language, sentence, difficult sentence, depreciatory references

**JEL Codes:** L29

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## FUNCTIONAL SUBSTITUTION OF A NASAL VOWEL WITH A NASAL VOWEL IN THE SPOKEN LANGUAGE OF FRENCH

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**Abstract:** This paper analyzes some cases of functional substitution of one nasal vowel with another one in the spoken language of French, as well as in some variants of French, spoken outside the territory of France. The reasons of generating the substitution at a phonetic and phonological level (subsegmental and segmental) are being studied. Attention was also drawn to the extra-phonetic factors leading to the manifestation of the process under consideration.

**Keywords:** functional substitution, nasal vowel, spoken language, French language

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## HOLINESS AS THE MEANING AND LOGIC OF LIFE

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**Abstract:** One of the main choices of the human civilization and the man himself is the choice between good and evil. Choosing the good awaits us much greater development and challenge. The meaning of the human life is in this development and upgrading. Holiness is a well - ordered logical ladder of self - improvement. It not only offers models, but also contains many challenges. It has become a clear and accurate indicator of personal moral development.

A turning point for the person is the realization that the achievement of holiness is entirely possible. If we make holiness the norm and purpose of our lives, we help not only ourselves but also other people in making their lives meaningful. The other alternative is evil, which offers an unpredictable spontaneous disorganization, asociality and small amplitude of development.

**Keywords:** Philosophy, Christian values, holiness

**JEL Codes:** L10, L11

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## IMAGES OF AUTUMN IN BULGARIAN AND ROMANIAN POETRY

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**Abstract:** *Autumn has always been poets' season. This report examines in parallel poems about autumn by famous Bulgarian and Romanian authors, analyzes the author's feelings and dramas when writing about this period of the year.*

*There are traditional and profound symbolic meanings of autumn. It symbolizes adulthood and maturity. Autumn represents the preservation of life and its basic necessities; it offers us a chance to reconnect with ourselves as we preserve our safe havens. Also, autumn means balance, harmony.*

*But autumn has always invoked mixed feelings among the writers. The season invoked nostalgia and childhood memories for them. Some poems about this season are songs of longing and mourning. They are charged with authors' sadness and melancholy.*

**Keywords:** *poetry, images of autumn, the lyrical I, feelings, landscapes, comparative reading.*

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## DISAMBIGUATION OF THE HOMONYMS FROM THE SEMANTIC FIELD *LIMITE* „BORDER“ IN FRENCH LANGUAGE CLASSES

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**Abstract:** The study is focused on homonymous units (homophones and homographs) from the semantic field of the word "limite", through which the idea of border was lexicalized in French. The difficulties in learning a foreign language, caused by homonymous pairs or sequences, in various practical components - reading comprehension, dictation and translation of text from French into Bulgarian are considered.

**Keywords:** Disambiguation, Homophones, Homographs, French language

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**FRI-ONLINE-ELETS(S)**

**FRI-ONLINE-ELETS(S)-01**

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**AUGMENTED REALITY IN E-LEARNING**

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**Abstract:** The publication presents the essence of the concept of 'augmented reality' and its application in e-learning. Emphasis is placed on the fact that the use of augmented reality learning objects in online learning is a way to transform traditional learning into digital.

The most significant advantage of augmented reality objects is the opportunity they provide to demonstrate activities related to the formation of skills, as an essential part of the competence of the trainees.

**Keywords:** E-Learning, Augmented reality, Digital transformation of learning.

**JEL Codes:** I20, I21

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## INVESTIGATION THE ELECTRICAL POWER QUALITY OF A METALS MELTING ELECTRIC INDUCTION FURNACE

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**Abstract:** The paper analyses electric power quality of a steel melting electric induction furnace. The measurements have been made in the second of the furnace transformer, on the LV line. The values of currents, voltages and its harmonics are recorded by three-phase power quality analyser MI 2885 Master Q4. The conclusions of experimental results of electric power quality of the investigated induction furnace are drawn.

**Keywords:** steel melting electric inductance furnace, electric power quality, harmonics.

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**FRI-ONLINE-ELETS(S)-03**

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## **INVESTIGATION OF THE INFLUENCE OF THE STROKE OF THE NOZZLE NEEDLE ON HYDRAULIC CHARACTERISTICS OF ELECTROMAGNETIC INJECTORS CRI 1**

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**Abstract:** *The report describes an experiment investigating the effect of the influence of the stroke of the nozzle needle on the hydraulic characteristics of electromagnetic injectors Common Rail. The first generation of electromagnetic injectors - BOSCH CRI1 was selected as the study object. The tests were made on a universal test bench for CMX6000X diesel fuel systems.*

**Keywords:** *Common Rail, hydraulic characteristics, electromagnetic injectors*

**JEL Codes:**

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www.bosch.com

## ARTISTIC INFORMATION AND LITERATURE FOR CHILDREN IN THE SPACE OF VIRTUAL CULTURE

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**Abstract:** *In the context of modern literary education, verbal and artistic perceptions aid creative, non-standard learning. At the primary school level, students communicate with works of children's literature mainly through virtual culture technologies. Reading decoding is transformed into the extraction of artistic meaning and moral messages addressed to digitally competent learners. In search of innovative pragmatic variants and ingenious didactic techniques, the renewed reading / literature lesson systematizes and enriches the children's receptive experience.*

**Keywords:** *methodological aspects of literary education 1st - 4th grade, literary interpretation and virtual teaching at the primary school level*

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**FRI-ONLINE-ELETS(S)-05**

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## **NEW EU MEASURES TO LIMIT CO<sub>2</sub> EMISSIONS FROM ROAD TRANSPORT**

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***Abstract:** In this report new EU measures to limit CO<sub>2</sub> emissions from road transport..*

***Keywords:** CO<sub>2</sub> emission, emission from transport, electric vehicles, vehicles*

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## PROBLEMS OF HARDWARE AND SOFTWARE FOR THE IMPLEMENTATION OF DISTANCE LEARNING

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**Abstract:** The paper contains comparative analyses of the distance learning software, which was most used by educational institutions during the COVID 19 pandemic. The comparative analysis consists of two parts. First part analyses the hardware requirements for use differentiated platforms, while the second one differentiates the specific concerning the software, that organization show provide. Models for synchronous and asynchronous distance learning are clarified and studied. We defined advantages and weaknesses of most applied platforms (based on educational practice of University of Ruse for last Four semesters) and provided recommendations for operation with platforms in the university.

**Keywords:** Distance learning, platforms for distance education, optimization of software and hardware use, it solutions,

**JEL Codes:** L86, I21, I23

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**OCTOBER RESEARCH CONFERENCE IN RUSE**

**FRI-2G.204FS**

**FRI-2G.204FS-01**

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**VISION FOR MODERNISATION OF  
UNIVERSITY OF RUSE “ANGEL KANCHEV”**

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***Abstract:** The central theme of the report is the modernization of higher education in Bulgaria.*

*The emphasis in the presentation of the University of Ruse is the regional and macro-regional significance of the university as a factor of positive change and socio-economic progress.*

*This is achievable through a sustainable and targeted policy of prudent investment and cooperation of scientific infrastructures. The sharing of resources and the building of networks between partner public, private and non-governmental organizations leads to the development and increase of the intelligent specialization of the Danube region.*

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**FRI-2G.204FS-02**

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**CONCLUSIONS IMPOSED BY THE PANDEMIC  
IN THE FIELD OF PUBLIC HEALTH**

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***Abstract:** The topic of the report is related to the accumulated conclusions from the pandemic. Covid19 is a very interesting phenomenon that leads to the concentration of certain things, to the crystallization of certain truths, positive and negative, both for the whole health system and for the nation as such.*

*“Unfavorable conclusions are needed - it turns out that we as a nation in a difficult time fail to organize and act decisively, unanimously, as other nations do and are already moving towards solving the pandemic. Obviously, this will happen to us in a slower, more painful and expensive way.”*

*The report substantiates two alternative proposals for anti-epidemic measures:*

*First, access to a number of activities and sites for public use should be done by presenting a certificate for vaccination, for illness, or for testing by rapid antigen test or PCR. This is the practice in a number of EU countries. It is proposed that this requirement apply to admission to educational, training, public, social, cultural, leisure, sports facilities and activities.*

*Secondly, alternatively, to determine additional capacity limitations and to terminate certain activities: suspension of congress-conference events, seminars, competitions, trainings, attendance forms in a lecture course, as well as non-practical exercises of students in higher education institutions.*

*Specific measures in the field of education are proposed.*

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**ESG AND CORPORATE FINANCIAL PERFORMANCE:  
THE MEDIATING ROLE OF GREEN INNOVATION.  
EVIDENCE FROM EUROPEAN FIRMS.**

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**Abstract:** *In the last few decades, Environmental, Social and Governance (ESG) performance has emerged as an important aspect for developing sustainable strategies that affect overall firm performance. Many firms, especially large multinational ones, have intensified their efforts to report on ESG matters in order to legitimate their behavior and improve their reputation.*

*Based on these statement I'm conducting (with several colleagues) a serial of studies to investigate the impact of each singular E-S-G dimensions on financial performance. In particular, in this research (Chouaibi, Chouaibi, Rossi, 2021) we focus the attention to the EU context (we study a sample of UK and Germany firms), and we investigate the direct and indirect links between ESG practices and financial performance using the mediate role of green innovation. . In other words, we investigate how the degree of green innovation intensity affects the relationship between ESG practices and financial performance by exploring the effect of the ESG practices on financial performance in two different legal systems (common law versus civil law).*

*The results show that the strengths ESG increase the firm value and the weaknesses decrease it. More specifically, we found that ESG firms that exhibit a high level of green innovation intensity are able to enhance their corporate financial performance.*

*This finding may be because, through green innovation, these firms are able to improve their financial performance through both cost leadership and product differentiation. The results also provide insights to regulators and the board of directors on future growth opportunities for the company and the country.*

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**PRINCIPLE AND CONSTRUCTION OF CONTINUOUS OPERATION  
DIGGER FOR BANANA TREE PLANTATION**

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**Abstract:** *Banana is a tropical fruit tree grown in many countries of the world with the largest areas of cultivation. It is a very potential agricultural product for both domestic and export markets. In Vietnam, however, the productivity of banana production is still not high, compared to that of other major markets, due to high labor costs and low labor productivity. One reason for this is low level of mechanization for banana cultivation, including the mechanization of drilling holes for planting. Drilling holes for banana planting in Viet Nam is still done manually or with low-productivity machines. Existing hole-drilling machines around the world, especially in Vietnam, are the ones with intermittent operation, resulting in low productivity. Therefore, it is necessary to create a new principle of continuous operation of diggers in order to increase productivity of drilling and to facilitate the work of operators.*

**Keywords:** *banana; diggers; drilling holes; continuous operation*

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**EXPERIMENTAL APPROACHES TO TEST ALLELOPATHY  
RELATIONSHIPS IN PLANT COMMUNITIES  
I. CARRIERS OF ALLELOCHEMICALS UNDER LABORATORY  
CONDITIONS FOR OPTIMAL DEVELOPMENT OF TEST PLANTS**

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**Abstract:** During the period 2020 - 2021 in the Institute of Forage Crops, Pleven a laboratory experiment was performed to establish the influence of three allelopathic carriers (distilled water, 95% ethyl alcohol (after evaporation) and 0.8% agar-agar) on germination, growth dynamics and accumulation of fresh biomass (g per seedling) in samples of annual and perennial cereal forage crops (*Sorghum sudanense* Piper Stapf., *Sorghum bicolor* (L.) Moench, *Sorghum bicolor* x *S. bicolor* var. *sudanense*, *Sorghum vulgare* var. *technicum*, Korn), *Lolium perenne* L., *Agropyron desertorum* Fisch., *Festuca arundinacea* Schreb.). It was found that the allelopathic carriers included in the study did not have a statistically significant effect on laboratory germination, growth dynamics (cm) and accumulation of fresh biomass (g per seedling) in the initial stages of test plant development.

The allelochemicals carriers used did not have an inhibitory effect on the development index (GI) of the accessions included in the experiment (GI from 94.9 to 1293.6%)  $GI \geq 80\%$ . In annual cereals, depending on the carrier, the  $GI_{average}$  is 115.1% when using 95% ethyl alcohol and 182.2% when using 0.8% agar-agar, while in perennial cereals it is in the range of 438.3 to 555.6%.

**Key words:** allelopathy, inhibition, carriers of allelochemicals

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## MULTIPLICATION OF WEED VEGETATION IN SPRING RAPES AND CRITICAL AND PERIODS IN ITS' DEVELOPMENT

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**Abstract:** During the period 2020-2021, in the experimental field of IASS "Obraztsov Chiflik" - Ruse, on soil type heavily leached chernozem/black earth/ field experiment was carried with spring rapeseed hybrid "Lakritz".

No pesticides, fertilizers or soil improvers unallowed for organic farming have been applied in the experiment. For the purposes of the study, weeding was monitored in the experimental plots.

Weeds found in experimental spring oilseed rape slabs for the study period with: *Setaria viridis* L., *Lamium purpureum* L., *Falopia convolvulus* L., *Chenopodium album* L., *Amaranthus retroflexus* L., *Solanum nigrum* L., *Poligonum aviculare* L., *Persicaria lapathifolia* L., *Anagalis arvensis* L., *Abutilon theophrasti* Medic, *Viola tricolor* L., *Anthemis arvensis* L., *Capsella bursa pastoris* L., *Convolvulus arvensis* L., *Cirsium arvense* L. Scop. *Cardaria draba* L. Desv., *Sorghum halepense* L., *Taraxacum officinale* L.

Weed associations in the fields with spring oilseed rape create a phytosanitary background in the crop, which determines the multiplication and spread of harmful entomofauna. For this purpose, it is necessary to perform systematic observations and reports on the dynamics and density of weeds and, if necessary, conducting struggle in crops.

**Key words:** organic farming, spring oilseed rape, weed communities, weed monitoring.

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## EVALUATION OF THE LEVEL OF WEEDING IN SPRING OAT VARIETY “ALEXI”

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**Abstract:** The aim of the present study is to establish the changes in the species composition of weed species and to assess the degree of weeding of spring oats crops variety "Alexi".

The experiment was performed according to the block method of Shanin, in the period 2020-2021, in the experimental field of IAS "Obraztsov Chiflik" - Ruse. Spring oats are grown on soil type highly leached chernozem /black earth/ under non-irrigated conditions, after the predecessor fodder peas variety "Ruse 1", when fertilizing with manure - 30 t ha<sup>-1</sup>.

The degree of weeding in the spring oat crop does not depend on the amount and distribution of precipitation during the vegetation of the crop. The increase in total weeding in 2021 is due to an increase in the density of annual monocotyledonous weeds – *Setaria viridis* L., *Echinochloa crus-galli* (L.) Beauv. u *Avena fatua* L., by about 1.5 to 2 times.

The change in the dynamics of meteorological factors, during the years of study, of the species composition (S), the diversity index (H) and the uniformity of distribution (J) of the weed communities in the spring oat crop change insignificantly. These indicators can be used in the development and implementation of more effective systems for weed control in the conditions of conventional, integrated or organic cultivation.

**Key words:** organic farming, spring oats, weeding, diversity index, uniformity of distribution, weed communities.

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## SELECTING A SEEDER FOR DIFFERENT MAIZE SOWING SCHEMES

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**Abstract:** In the conditions of intensive agriculture an important factor for obtaining high yields of corn is the accuracy of sowing. The right selection of seeder and the appropriate sowing scheme is a prerequisite for quality work. This study provides a comparative analysis of the advantages and disadvantages of different types of seeders for maize. The settings of some more important technical parameters of these seeders are considered, and a thorough review of the existing conventional sowing schemes is performed. Attention is also paid to some non-traditional ways of sowing double rows and chess sowing, which are increasingly used in the agricultural practice of Bulgaria, and a suitable seed drill has been selected for their implementation

**Keywords:** Sowing Schemes, Sowing Double Rows, Chess Sowing, Seeders

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## FEATURES OF FIELD EXPERIMENTS WITH VEGETABLE CROPS IN OPEN AREAS

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**Abstract:** *The paper reviews existing methods of experiments in vegetable production with crops on open land plots has a lot in common with the experiments in the field cultivation of agricultural crops. In these experiments the generally accepted methodological methods are used: observance of the requirement for typicality of the experiment and representativeness of the experience; observance of the principle of the only difference and the reliability of the experience, typical and representative of the experience; compliance with the principle of single difference and reliability of experience. The peculiarities of the technique when placing experiments with vegetable crops in open ground are: greater variety of plants; large differentiation of plot size; the number of options studied and the choice of control; way to record and evaluate the quality of the harvest.*

**Keywords:** *Agricultural experiment; Experimental precision, Vegetable crops, Field Experiments Model*

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**STATISTICAL DISTRIBUTION OF THE DETAILS FROM  
AGRICULTURAL MACHINERY MADE FROM CAST IRON**

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**Abstract:** The article presents a classification of the cast iron parts to be restored by surfacing from agricultural machinery. The structural characteristics of the cast iron details necessary for compiling the recovery routes as well as the selection and calculation of the working regime parameters are determined. The study found that most cast iron parts are used in wheeled tractors, followed by tracked tractors and combines, with newer brands having 1.5 times more cast iron parts. The distribution of the details by types of cast iron shows that the most widely used are the details made of gray cast iron, followed by the details made of malleable and special cast iron. It is determined that the most common brands are gray cast iron EN-GJL 150 and malleable cast iron EN - GJS 400, with a tendency to increase the use of medium and high strength cast iron.

**Keywords:** agricultural machinery, cast iron, structural parameters

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## CLASSIFICATION OF THE IMPACTS OF THE QUALITY OF THE OBJECT OVER THE ENVIRONMENT

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**Abstract:** The article classifies the impacts of the quality of the objects upon the environment according to four main features: nature, duration, indicators and consequences from the impacts. The structure of the consequences of the impact of the quality of the sites on the environment has been developed. There are 4 types of forms of disturbances and pollution of the environment from different sources of impact: geochemical, hydrospheric, atmospheric, biocoenotic.

**Keywords:** quality, environment

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## SELECTION OF VARIABLES AND CRITERIA FOR EVALUATION OF VIBRATING ARC PROCESS DURING RECONDITIONING OF DETAILS FROM CONSTRUCTION AND AGRICULTURAL MACHINERY

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**Abstract:** The variables and criteria for an evaluation of the vibrating arc process during reconditioning of details from construction and agricultural machinery are determined in the article. A quality criterion for an evaluation of the properties of deposited layers is accepted as a main criterion. It is defined by the tribological properties of the deposited layers – mainly due its wear resistance. The process variables might be divided into two main groups – cinematic and technological, which includes the speed of deposition affecting the process productivity; wire electrode vibrating frequency and amplitude affecting the process stability; type and composition of gas shielding atmosphere affecting the transfer of molten metal as well as the type and composition of the wire electrode itself.

**Keywords:** vibrating arc overlaying, process variables, criteria for evaluation

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## MODELING OF DYNAMIC PROCESSES WHEN STARTING A ELECTRIC HOIST MOTOR

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**Abstract:** When a cone shaped electric hoist motor is switching on there is an axial motion of the rotor -movable friction cone system. That motion stops when the system hit an axial bearing. The present work show dynamic models that describe the process of the system in the time of the impact and after it. The models can be used for determining the electric motor elements force loading and examination the effect of different factors on the size and number of axial impacts.

**Keywords:** electric hoist motor, dynamic processes, modelling.

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## COMPARISON BETWEEN DIFFERENT TYPES OF “IN-CYLINDER” TRANSDUCERS FOR DIAGNOSTICS OF ENGINE MECHANICS BY PRESSURE

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**Abstract:** The present paper describes the experimentation in a controlled environment using different “in-cylinder” transducers for the purpose of selecting those device, which can be employed for diagnostic of engine mechanics. Their technical characteristics and the obtained experimental dependences for the voltage change depending on the pressure are compared. In a real environment, the mechanics of gasoline and diesel internal combustion engines with a car oscilloscope are diagnosed.

**Keywords:** In-cylinder Pressure, Internal Combustion Engine, Diagnostic, Mechanical Parts

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## RESEARCH ON CONSUMPTION OF SPARE PARTS IN AGRICULTURAL MACHINERY MAINTENANCE

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**Abstract:** In the maintenance of agricultural machinery spare parts play an important role in the technological process. The study of the cost of spare parts allows for their optimization. This article addresses issues related to the cost characteristics of spare parts. The results of the research of the spare parts for agricultural machinery are given. An analysis of the obtained data was made.

**Keywords:** maintenance, spare parts, spare parts consumption characteristics, spare parts forecasting

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## ANALYSIS OF MACHINERY MAINTENANCE AND INDUSTRY 4.0

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**Abstract:** Nowadays there is a specific change undergoing in the development of industrial equipment. This change was dictated by the fourth industrial revolution called INDUSTRY 4.0. This article analyses INDUSTRY 4.0 and Maintenance of Machinery. The peculiarities of the new generations of machines and their connection with the modern development trend are given.

**Keywords:** Maintenance, E-Maintenance, Industry 4.0, Cyber Physical Systems, Internet of Things, System of Systems, Smart Products.

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## ANALYSIS OF CONTAMINATIONS IN USED INTERNAL COMBUSTION ENGINE OILS AND THE REASONS FOR THEIR OCCURRENCE

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**Abstract:** Engine oil plays a crucial role in engine performance. It has certain parameters that must be observed. Oil contamination violates the qualitative and quantitative values of the oil parameters. This article discusses issues related to the types of contamination, their origin and their impact on engine parts and performance. Conclusions from the analysis are given.

**Keywords:** used oil, oil parameter, oil contaminations

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## ANALYSIS OF THE METHODS FOR NON-DESTRUCTIVE TESTING OF RAILWAY TRACKS

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**Abstract:** This article discusses issues related to rail track failure. The methods and means for non-destructive testing of materials are analysed. The most commonly used ultrasonic method for material control is discussed in detail. New trends in Industry 4.0 and cyber physical systems are included. From the point of view of the development of information technologies, an analysis has been made of the influence of the Internet of Things on the health condition of the railway. Conclusions of the analysis are given.

**Keywords:** defect, non-destructive testing, ultrasonic defect, cyber physical systems, Internet of Things.

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**COMPARATIVE ANALYSIS OF THE NOISE GENERATED BY  
HYDRAULIC SYSTEMS WITH CENTRIFUGAL FAN, AT TWO FLOW  
RATE ADJUSTMENT METHODS**

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**Abstract:** The paper presents a methodology for conducting experimental tests of noise generated by a hydraulic system with a centrifugal fan. Adjustment was performed by 2 methods: by applying Variable-frequency drive at the supplying electromotor and by using inlet guide vanes. The noise analysis were performed, as a function of the adjustment method. The parameters that were measured include- A weighted sound pressure level and sound pressure level in octave bands. A statistical analysis of the obtained values was performed, presenting the histogram of distribution of the sound pressure levels. The normal distribution law and the histograms of the noise values for each second, is performed. This is done for 1000 values for each operating mode of the system. The study concludes the relationship between operating modes of the hydraulic system and the levels of emitted noise. It is important to realise the link between noise and operation and to preserve the health of the workers.

**Keywords** noise measurements, spectrum, octave bands, centrifugal fan, flow rate adjustment, sound pressure

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## INTEGRATED SYSTEM IN EXCEL AND SOLIDWORKS FOR AUTOMATED DESIGN OF STANDARDIZED NOZZLES ISA1932

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**Abstract:** In the present work, an idea for automation of engineering work with the use of existing software without the need to develop a specialized one has been implemented. In this case, a system has been developed in the environment of Microsoft Excel and Solidworks for automated design of a standardized ISA1932 nozzle for flow measurement according to the international standard ISO 5167-3. The following stages of the design are automated: all calculations according to the standard, including the reporting of intermediate tabular values and coefficients; the construction of the calibration characteristic; determining the structural dimensions of the nozzle and flanges; the preparation of the working drawings and the assembly drawing. The calculations and the construction of the characteristic are performed in Excel. For automatic reading of tabular data, integrated functions in Excel for linear and bilinear interpolation in parts with the help of VBA have been created. The drawings are made in Solidworks, and the dimensions in them are linked to the calculations in Excel with the help of the Design Table created in each drawing in XLSX format. All this allows all stages of the design to be performed without the need for user intervention.

**Keywords:** Standardized nozzle ISA1932, flow measurement, calibration characteristics, automated design.

**JEL Codes:** L10, L11

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**PURPOSES IN THE DEVELOPMENT OF THE CENTERS FOR  
PRODUCTION OF SEEDLING MATERIAL FOR CULTIVATION OF  
BIVALVE ORGANISMS**

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**Abstract:** *The study traces the tendencies in the development of centers for the production of seedling material for cultivation of bivalve organisms in a controlled environment. The need for the creation and subsequent operation of such centers is argued. The main factors that influence the technological process are taken into account, the most important of which are: location and access to appropriate water resources; communication and transport connectivity; supplement of the site with additional materials, electricity and drinking water; the availability of qualified staff, proximity to academic structures and their resources, etc. The separate technological spaces are also considered, regardless of the scale of the site, the configuration, the distribution and the type of construction.*

**Keywords:** *Bivalve hatchery, Nursery for bivalve spat, Cultured bivalve species, Design of suitable facilities*

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## INTRODUCTION, ACCLIMATIZATION AND NATURALIZATION OF A SEEDING MATERIAL FROM BIVALVE ORGANISMS IN NATURAL CONDITIONS

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**Abstract:** In the paper, one of the most important stages of the production cycle in the cultivation of bivalve organisms after metamorphosis is considered, namely - their subsequent introduction, acclimatization and naturalization to the conditions of potentially suitable places in the natural environment. The choice of a water basin (or part (s) of it) has an impact on the successful acclimatization of the species of bivalve organisms selected for introduction into aquaculture. It is essential to determine whether the conditions of the new environment are able to meet the requirements and biological characteristics of bivalves.

**Keywords:** Bivalve organisms, Introduction, acclimatization and naturalization, Natural environmental conditions

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## STATUS AND FORECAST OF PM POLLUTION - A KEY ELEMENT FOR ATMOSPHERIC AIR QUALITY AND POPULATION HEALTH

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**Abstract:** Air pollution is a local, pan-European and intercontinental problem. Air pollutants released in one country can be transported into the atmosphere, which degrades air quality elsewhere. Atmospheric pollution with PM<sub>10</sub> is a long-standing problem in Bulgaria. Atmospheric air pollution with PM has both a social and an economic aspect. High levels of air pollutants PM<sub>10</sub> are a problem of great importance for human health. For nearly 30 years, the EU has been creating legislation to protect clean air, which sets limits on the concentration of pollutants. However, polluted air is still common in most EU Member States and in many European cities. This article discusses the measures taken and the future prospects for lowering the levels of PM<sub>10</sub> in Bulgaria.

**Keywords:** air pollution, morbidity, PM<sub>10</sub>

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## STUDY ON COMPOSITES OF WOODEN AND RUBBER PARTICLES SETTING UP AN EXPERIMENT

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**Abstract:** Wood waste and End-of-life (EOL) tires accumulate in huge quantities and create problems from an environmental point of view, both for people and the environment. They are part of industrial, transport and household waste. They are generated mainly by the timber and wood processing industries, the production of rubber products and the unnecessary car tires. The creation of composite materials using wood and rubber particles provides great opportunities on the one hand to reduce and recover waste and on the other hand for a variety of cost-effective applications in various fields.

The report discusses possible solutions for the creation of composite materials from waste wood particles and rubber particles obtained by grinding EOL car tires (rubber grinders). The emphasis is on creating an opportunity for experimental research and measurement of different physico-chemical and mechanical properties of composites with different percentages of wood and rubber particles. Several types of matrices for the production of composite materials with a shape and size suitable for the use of measuring equipment are presented. The research is aimed at creating composites with the possibility of applications for floor and insulation coatings.

**Keywords:** composite materials, wood particles, rubber grinders, floor and insulation tiles

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## METHOD FOR INVENTORY OF ENVIRONMENTAL ASPECTS IN ORGANIZATIONS

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**Abstract:** The paper presents a method for determining the significance of environmental aspects in accordance with the requirements of the standard ISO 14001: 2015. Environmental management systems - Requirements with guidance for use and the European scheme for environmental management and audit EMAS. The principle of expert self-assessment is applied. It consists in expert generation of information about environmental aspects and their significance and self-assessment by experts in organizations. The inventory of environmental aspects is carried out in five stages. The first stage describes the activities in the organization. The second stage requires expert determination of the environmental aspects of the activities. The significance of the environmental aspects is then assessed differently. The fourth stage is a summary assessment of significant environmental aspects. The minimum value of the summary assessment is 1. The maximum value is 2500. The range from 1 to 2500 is divided into degrees depending on the perceived degree of accuracy. After determining the summary assessments, a checklist of significant environmental aspects is compiled, in which they are arranged in descending order. The terms and the sequence of implementation of the measures for limitation of the ecological aspects and their impacts are graded. The method has been tested in five organizations with different economic activities. It is easy to apply and is objective enough to assess and inventory environmental aspects.

**Keywords:** Method, Inventory, Environment, Aspect, Organization.

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## STUDY OF THE SOIL HARDNESS, AS AN ECOLOGICAL INDICATOR OF ITS CURRENT STATE

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**Abstract:** Studies to determine the physical condition of the soil, analyzing the effects of energy resources and machine-tractor units on soil compaction have been carried out. The hardness of the soil on the traces of the agricultural machinery, as well as on the cultivated agricultural area has been experimentally determined. A comparison was made between the two and conclusions were done.

**Keywords:** Efficiency, Soil, soil hardness, agricultural machinery.

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**RESEARCH OF THE DIDACTIC FEATURES IN THE GAME DESIGN  
EDUCATION**

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**Abstract:** The paper reviews the didactic features in game design training, making the correct comparison between the designer's "specializations" in the field of game design and in "conventional" design. This was achieved by briefly looking at 22 types of design practices in the game industry, related to their place in the structural-object model of design. The article launches the idea that game design can be considered as a virtual analogue in all known familiar various designs (products, architecture, graphics, interior, fashion, etc.), but intended for electronic environment and subject to its own, different from known, laws.

**Keywords:** Design, Didactics, Education, Communication, Game Design, UX Design, AI Design.

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**FRI-ONLINE-1-ID-02**

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**SPEAKING AND COMMUNICATION IN PUBLIC LIFE.  
SOCIO-LINGUISTIC ANALYSIS OF COMMUNICATION**

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***Abstract:** The paper reviews the following philosophical realities: the political class - media, prominent intellectuals - media, experts in economics media, “ordinary” people - media. Foreshortenings of the impact of this type of communication on the aesthetic taste and aesthetic education of children, pupils, students and young people in general in Bulgaria.*

***Keywords:** Philosophical Realities, Media, Aesthetic Deucation*

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## ADVERTISING CHARACTERS. NEW ADVERTISING PRACTICES

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**Abstract:** Modeling and mock-uping is widely used in various areas of our lives. In industrial design, architecture, spatial design, landscape design, material production, cinema, entertainment industry, advertising, hobbies, etc.

Every proposal, every idea, no matter how attractive at first sight, cannot be implemented as a construction and production equipment, if they have not previously been obtained as a material object in the form of a model, prototype or sample experience.

The creation of three-dimensional material images makes it possible to obtain a complete visual idea of the designed product from the various stages during design, its qualities and shortcomings.

Through modeling and mock-uping increase the possibilities for operational visualization.

In model - mock-uping practice there is a great variety of models created in different areas and for different purposes. Often models made with the same techniques and with the same impact are called with different definitions and terms. The purpose of this article is to propose a classification of models and unification of definitions and terms related to models and models.

**Keywords:** advertising, advertising characters, advertising figure, advertising face, influencers.

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## THE DEVELOPMENT OF AESTHETIC VARIANTS ASSOCIATED WITH NATURAL FORMS IN THE SMOKING PIPES IN ORDER TO REDUCE TO SMOKING

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**Abstract:** *Creating smoking pipes- design, associated with different organic forms is possible to reduce smoking, at the expense of aesthetic contemplation, which would assimilate smoking time. Thus, the application of aesthetic methods to reduce smoking will tip the scales in favor of aesthetic pleasure at the expense of ingestion of harmful substances with tobacco smoke.*

*The **Keywords:** aesthetics pipe, art pipe*

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## CARS SUSPENSION GEOMETRY - MAIN PARAMETERS

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**Abstract:** When it comes to design suspension geometry from scratch, you need to understand every suspension parameter influence to get a good result. Once understood, the design process begins by choosing target values to get to the expected behavior. After the design process comes the validation step to check suspension parameters variations with suspension motions. All these steps of the design process are explained in a small set of articles starting with this one: suspension parameters.

**Keywords:** Design, Suspension Design, Automotive engineering, Double wishbone suspension

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## CONCEPT FOR SUSPENSION GEOMETRY WITH DOUBLE WISHBONE

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**Abstract:** When it comes to design suspension geometry from scratch, you need to understand every suspension parameter influence to get a good result. Once understood, the design process begins by choosing target values to get to the expected behavior. After the design process comes the validation step to check suspension parameters variations with suspension motions. All these steps of the design process are explained in a small set of articles. This one is the second and it is relative to the suspension geometry design.

**Keywords:** Design, Suspension Design, Automotive engineering, Double wishbone suspension

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## METHODOLOGY FOR RESEARCH OF BASIC PARAMETERS FOR DOUBLE WISHBONE TYPE SUSPENSION USING CAD PROGRAMS

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**Abstract:** Sports cars use mainly suspensions of the type double wishbone where shock absorbers are hidden in the body of the car so that they do not affect the air flow. The technology for designing such suspensions is extremely complex and requires specialized knowledge.

Methodologies for research of parameters for suspension using CAD programs give opportunities to study the parameters of the car suspension during its design. The testing of the main parameters of the suspension is of extreme importance for the automobile industry, and their usage reduces the costs of modelling, prototyping, and possible mistakes in the production process.

**Keywords:** Design, CAD software, Suspension, Double wishbone, Caster, Camber, TOE, Bump Steering, Ackermann angle, Car design, Design of Vehicles

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## INTERIOR LIGHTING DESIGN OF A MULTIFUNCTIONAL UNIVERSITY HALL. “EDUCATIONAL HALL OF THE FUTURE”

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**Abstract:** This report presents an interior lighting project for a representative multifunctional hall (“Educational Hall of the Future”), located in the Rectorate of the University of Ruse “Angel Kanchev”. The application of the hall aims to create an atmosphere adapted to research work that inspires young scientists and for this purpose a futuristic look is sought, both in terms of the individual elements of the interior furniture and lighting design. The focus of this study is the quantitative dimensions of the designed interior) lighting.

**Keywords:** interior lighting, educational hall, futuristic vision, LED, quantitative dimensions, lighting design

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## SYSTEMIC LIGHTING DESIGN OF A REPRESENTATIVE MULTIFUNCTIONAL UNIVERSITY HALL

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**Abstract:** This report represents a systematic design approach covering the philosophy and the practical application of the multi-component and multifunctional lighting systems. The latter are very suitable for interior in which a variety of visual tasks and activities are performed with different lighting requirements and locations. The individual components of lighting allows the effective implementation of visual tasks with adequate energy and economic logic.

A project for interior lighting of a multifunctional university hall has been developed, with five modes of operation: representative, working, economical, routine weekday, hybrid. For each of the modes are given the functions, the lighting realization, the conditions and the peculiarities when using the hall (including light zoning, light modeling, personalization, individualization). It is planned to use LED panels, the individual control of which is carried out by means of an intelligent system with the possibility to separate light zones.

**Keywords:** systematic design approach, interior lighting, educational hall, LED, lighting design

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**ANALYSIS OF THE PRECISION OF THE HUMAN-MACHINE METHOD**

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***Abstract:** The dynamic development and achievements of machine-building enterprises lead to newer and more precise requirements for the functionalities of the human-machine method. The precision of the method of human-machine interaction varies depending on the level of knowledge of the technological process and the extent to which the human or machine is involved. Participation can be distributed so that in a given situation when the machine is operating, the person has to control the control of the machine precisely, and this can lead to the greatest efficiency.*

***Keywords:** Quality, Quality Management, Quality Management System, Human–Machine System, Modelling*

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## TOOLS FOR FRICTION STIR WELDING: REVIEW

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**Abstract:** Friction stir welding is a process of joining solid metal materials with the help of a special rotating tool (third body), without the use of additional material. It is characterized by: preservation to a large extent of the properties of the base metal in the welding zone; high mechanical properties of welded joints; possibility to obtain quality welded joints from alloys, which in fusion welding are prone to the formation of hot cracks and porosity; there is no losses of alloying elements during welding; limited heat input; less pressures and deformations, etc.. These features make it up-to-date and increasingly used in the field of industrial welding - in aviation, automotive industry, railway transport, nuclear industry and many others.

The obtaining of quality welded joints by this method depends on a number of factors, the most significant of which are the mode parameters (frequency of tool rotation, welding speed, pressing force and tool tilt) and the type of the tool used.

The tool consists of two main parts – shoulder and specially profiled pin. In the process of work the tool enters between the welded parts moving at working speed. As a result of the friction forces, mainly between the tool shoulder and the welded parts, the base metal is heated to a plastic state without melting, mixes with the pin and displaces in the free space behind it. The volume in which the welded seam is formed is limited at the top by the tool shoulder.

As the tool must have good wear resistance, heat resistance and strength at high temperature, tool steel H13 (AISI), SKD61, SKD11, SKH57 (JIS) or martensitic stainless steel SUS440C (JIS) are most often used for its production. It is possible composite tools to be used in which the pin is made of cobalt alloy MP159, and the shoulder is made of H13. The temperature characteristics of the process and the quality of the upper part of the welded seam largely depend on the shape and the diameter of the tool shoulder. The quality of mixing in turn is determined mainly by the pin design.

The paper present the features and existing solutions regarding the material, shape, dimensions and construction of the tools used, depending on the type, thickness of the parts and the used parameters of the friction stir welding mode.

**Keywords:** friction stir welding, tools, features

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## MECHANICAL PROPERTIES OF ALUMINIUM ALLOY AA1050 WELDED BY FRICTION STIR WELDING

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**Abstract:** *One of the most intriguing achievements in the field of welding in the last three decades is the development and the spread of the new technological method of friction stir welding. This method was patented in 1991 by The Welding Institute, and today it is intensely developing all over the world. Friction stir welding refers to the processes of joining in solid state using a specialized tool (a third body); this tool rotates between the welded parts and moves with some working (traverse) speed. Friction stir welding gives completely new tendencies in welding technology and allows many of the welding by melting issues to be resolved. This method does not lead to the excretion of harmful gases, slags, metal splashes, and loud noise, and this fact allows the working environment to be safer while increasing productivity.*

*The careful consideration of suitable welding parameters plays important role in the making of high-quality weldments. These parameters include tool geometry, tool rotational speed, tool traverse speed, tilt angle, and axial force. The quality, residual stresses and deformations depend on the amount of the heat input, which in turn depends on all listed above welding parameters.*

*Friction stir welding is applicable mainly for joining of materials with a relatively low melting point, primarily aluminium and its alloys, including combinations of different aluminium alloys. Friction stir welding is successfully used for joining copper, nickel, titanium alloys and some steels.*

*The present study reports results on the mechanical properties of weldments made by friction stir welding. The welded parts were of aluminium alloy AA1050 sheets 4 mm thick. The welding tool was with a threaded cylindrical working part. The influence of the main working parameters (rotational speed and traverse speed) on the hardness at the welding area and mechanical characteristics during tensile test was investigated. Recommendations on the choice of welding mode for the particular welding case were made.*

**Keywords:** *friction stir welding, mechanical properties, Aluminium Alloy AA1050*

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## FLAT GASKET IN INDUSTRY: A REVIEW

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**Abstract:** The paper considers the need to use flat seals in the industry from deformable material in the flange connections, which serve as a barrier between the fluid in the system and the environment. The seals also compensate for surface imperfections and flange defects. A brief classification of the types of seals and the materials from which they are made has been presented. Various metallic, non-metallic and combined flat seals used for static sealing in the presence of flange joints are considered. Frequently used in practice types of seals are presented, paying attention to their advantages, disadvantages and working conditions. Particular attention is paid to the seals made of polytetrafluoroethylene / PTFE or Teflon / and expanded polytetrafluoroethylene / ePTFE / and the technologies for the production of both types of sealing material. The existing standardized methods and test procedures for determining the limit parameters of the various seals are indicated, in order to properly install and avoid the possibility of damage and accidents. Conclusions are made on the development of new structures and solutions using known materials in order to reduce emissions into the atmosphere and fluid leakage. This will contribute to environmental protection, reduction of raw material losses, efficient and safe operation and longer service life of the seals.

**Keywords:** flat gasket, expanded polytetrafluoroethylene /ePTFE/, creep relaxation factor

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## INVESTIGATION OF THE INFLUENCE OF TECHNOLOGICAL PARAMETERS ON VIBRATION RESISTANCE IN MODELING THE TECHNOLOGICAL SYSTEM

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**Abstract:** It is known that in mechanical processing by mechanical cutting there are prerequisites for the occurrence of vibrations at low stability of the technological system. Such are the cases when processing thin-walled beams, e.g. columns of truck cranes, which are of great length, thin walls and low stability. In serial production, machining centers and special devices (equipment) are used to establish the column to the working table of the machine. The main purpose of these devices is to ensure a precisely oriented and constant position of the beam relative to the coordinate system of the machine, but does not take into account the possibility of vibration. One of the possible solutions, discussed in previous publications of the author is by increasing the stability of the system by adding additional supports and attachments. For this purpose, a modal analysis is applied with the help of a CAD system for determining the locations of additional supports and attachments. The disadvantage of the obtained result is that it is idealized and would have a higher practical utility if the disturbing effect of the scattering of some basic input conditions is taken into account. Such are, for example, the deviations from the theoretically determined location of the additional supports, the scattering of the modulus of elasticity of the beam material, the thicknesses of its walls and the change of this thickness as a result of the processing. The publication presents the results obtained in studying the influence of these factors. Their tolerances have been obtained that would not compromise the expected vibration damping effect.

**Keywords:** Metal cutting, vibrations.

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## **A MULTIPHYSICS MODEL OF AN ELECTROMAGNETIC LAUNCHING SYSTEM**

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**Abstract:** *A three-dimensional model of an electromagnetic launching system is developed. The model consists of electrical and mechanical parts and it is a multiphysics system. This is the first step of the research and the model is theoretical. It can be the basis for future investigations, optimizations and physical prototypes manufacturing. Time diagrams of the coil current, the electromechanical force acting on the projectile, the position of the projectile, and the velocity of the projectile are created, compared, and analyzed.*

**Keywords:** *Launching System, Multiphysics Model, Electromechanical Force, Position, Velocity*

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## INVESTIGATION OF THE INFLUENCE OF COOLING RATE ON SHRINKAGE CAVITY AND POROSITY FORMATION IN AL-SI ALLOY

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**Abstract:** The report presents the results of a study the shrinkage porosity in Al-Si alloy with sub eutectic composition. The influence of the cooling rate (using metal and sand moulds) on the shrinkage cavity volume and porosity was studied. The results illustrate the effect of liquid and solid state shrinkage of the metal on this phenomenon. Simulation experiments were also carried out and analysed.

**Keywords:** Manufacturing technologies, Foundry technologies, Casting of metals, Porosity

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## COMPARATIVE STUDY OF MATERIALS AND TECHNOLOGIES IN ORTHODONTICS

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**Abstract:** The report systematizes the materials and technologies for diagnosis and treatment of occlusion in dentistry. Prospective digital technologies for expert diagnosis of orthodontic condition in patients are considered. It has been shown that any medical dental action affects the whole body, for example temporomandibular joint dysfunction (TMJ) can cause a problem in another part of the body. The synergy of engineering and medical approaches in this field of science is very important to achieve significant results..

**Keywords:** Materials in dentistry, Orthodontics

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## CLASSIFICATION, PRINCIPLES AND APPLICATIONS OF TECHNOLOGICAL LASERS

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**Abstract:** *The report discusses the principles for creating a laser beam, in particular the so-called "Laser pumping", consisting of supplying energy to the active medium converting it into a state of "inverse population". The sources of laser pumping are described: electric discharge in gas, current in semiconductors, chemical processes and the corresponding different types of laser systems are summarized. The classification of lasers according to their spectral range, power and radiation mode is also shown. Various areas of application such as communications, medicine, industry, military, research and measurements are presented.*

**Keywords:** *Lasers, Laser beam, Laser Technologies*

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## **METHODOLOGY FOR DEFORMATION INVESTIGATION IN WELDED JOINTS USING THE COORDINATE GRID METHOD**

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**Abstract:** *The report presents a methodology for studying the deformations in welded plates for the comparative analysis of different process capabilities (e.g. welding in a protective gas environment, pulse welding, etc.). An adapted method of coordinate grids is used which allows a more detailed study of the deformations distribution in the heat affected zone and in the more distant parts of the welded joint. Initial results are presented and the applicability of the methodology is analysed.*

**Keywords:** Welding technology, Grid method

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## INFLUENCE OF SPEED IN 3D PRINTING BY FDM METHOD ON THE ACCURACY OF THE OBTAINED DIMENSIONS OF DETAILS

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**Abstract:** *This study presents the production of precise details in 3D printing by FDM method and determined the influence of speed on the accuracy of the obtained dimensions. As the speed increases, it is found that the deviations from the dimensions increase. The optimal speed modes for the smallest deviations have been determined and reference samples have been developed allowing for an adequate comparative assessment of the capabilities of the 3D printer.*

**Keywords:** *Rapid prototyping, 3D printing, 3D Prototype models, FDM, precision printing, printing speed*

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## INFORMATION ASSURANCE OF THE TECHNOLOGICAL DESIGN CONCERNING THE INFLUENCE OF THE ELASTIC DEFORMATIONS ON THE ACCURACY BY TURNING OF THE DETAILS

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**Abstract:** The article analyzes what information is necessary to determine the degree of influence of elastic deformations at the stage of technological design to ensure the accuracy and quality of accurate turning transitions. The summarized information about the type, factors and conditions related to the occurrence and impact of elastic deformations on the output parameters of the machined surfaces is presented graphically. To evaluate the arising deformations, a mathematical model is developed which determines their relationship with the influencing factors.

**Keywords:** elastic deformations, information assurance, turning, accuracy

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## SYSTEM FOR CAVITATION COLD BLENDING OF LUBRICANTS

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**Abstract:** *The present lubricant market puts a more and more stringent requirements on the product quality. The constant increase of specialized oil types and complexity of its formulations requires high flexibility and quality of production from manufacturers as well as constant operational cost reduction to have competitive advantages, best service and prices. Taking into account the requirements mentioned above, system for cavitation cold blending of lubricants is a lubricant production equipment that has sufficient benefits for the end user, providing a significant return on investment and a return on investment in a very short period of time. The system allows improving the productivity of mixing plants, as well as saving money for its owners.*

**Keywords:** *Lubricant, Blending, Cavitation,*

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## **STUDY OF THE PERFORMANCE OF PALLETIZING EQUIPMENT**

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**Abstract:** *Automated palletizing of packaged products is used in various production processes, which achieves operational safety, flexibility and higher performance.*

*The article discusses issues related to optimizing the operation of a robotic module for palletizing packaged bulk material in order to increase the productivity of existing equipment. A simulation model has been developed in the environment of GPSS World, allowing the study of the influence of certain factors on the performance of the module and the obtained results are presented.*

**Keywords:** *Automation, Robotics, Robotic Technology Module (RTM), Probability model, Performance of RTM.*

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**STUDYING OF A SERVO SYSTEM IN STATE SPACE**

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**Abstract:** This paper discusses a way to control a servo system in a state space. For the purpose of the study, a laboratory modular servo system of INTECO Company was used in combination with MATLAB / Simulink for research of different types of control systems. Within the study, a state controller and an observer were synthesized. The operation of the two types of control systems is compared, and a comparative analysis is made with a standard PD regulator. The results of the study show that both regulators meet the quality requirements of the system, and the transient processes are identical, but when using a state observer, the system can be controlled without the need to measure state variables (motor speed).

**Keywords:** State space control, State Space Observer, Laboratory Servo System, MATLAB/Simulink.

**JEL Codes:** L60

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## APPLICATION OF THE GENETIC ALGORITHM FOR SPEED CONTROL OF DC MOTOR

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**Abstract:** The paper deals with the design of PID controllers for speed control of DC motor using genetic algorithm (GAPID). The genetic algorithm is an optimization procedure, where the fitness function to be minimized includes the results of simulation of the control system and a selected performance index evaluation. The characteristics of the systems with conventual tuning PID and GAPID controllers are analyzed. As a result optimal parameters such as overshoot percentage and setting time for speed control of DC motor were obtained by genetic algorithm.

**Keywords:** PID controller, Genetic algorithm, Optimal control

**JEL Codes:** L60

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## INVESTIGATION THE ELECTRIC ENERGY CONSUMPTION OF A METALS MELTING ELECTRIC INDUCTION FURNACE

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**Abstract:** The paper analyses electric energy consumption of a metals melting electric induction furnace for a longer period of time. The values of consumed monthly and yearly electric energy by price tariffs are measured and presented. The results are analysed.

**Keywords:** metals melting electric inductance furnace, electric energy, price tariff.

**JEL Codes:** L60

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## DESIGN AND DEVELOPMENT OF A VIRTUAL POWER METER IN THE EEEEE ENVIRONEMNT

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**Abstract:** The measurement of power and the monitoring of power quality is important in electrical engineering and energetics. This paper presents the design and development of a virtual power meter for the Engine for Virtual Electrical Engineering Equipment (EEEE). According to the concept of the environment, the equipment is implemented on two levels: on functional level a SPICE netlist is used with variables and operations and on graphical level is used a 2D model and PNG images. Next, a virtual lab is created containing an AC source, breadboard, the power meter and passive elements. It is used to evaluate the accuracy of the developed equipment. The obtained results show that the relative error of the measurements do not go above 6%, which indicates that the virtual power meter can be used for performing virtual experiments.

**Keywords:** Virtual lab, Power meter, SPICE, power factor.

**JEL Codes:** L60

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## EFFICIENCY OF ELECTROMAGNETIC TREATMENTS IN COTTON

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**Abstract:** Summarized results for the effect of the pre-sowing electromagnetic treatment and the influence of the storage periods before and after treatment on the sowing qualities of seeds of five Bulgarian cotton varieties were considered. The voltage between the electrodes (U) kV of a specialized device and the duration of exposure (t) s were perceived as controllable factors of the electromagnetic treatment. It was found stimulating effect of the energy impact on the sowing qualities of cotton seeds after their treatment in the electromagnetic field. The best variants of the controllable factors were identified - combinations of the duration of exposure (t) s and the field intensity (U) kV determining the level of the energy portion for the highest positive stimulating effect at a specific varieties' reaction. Possibilities for using the electromagnetic treatment of cotton seeds in case of their storage in order to preserve or stimulate their sowing qualities have been discovered. A serious theoretical and practical base has been built by the research team at the University of Ruse - Ruse, scientific and professional experience has been gained, allowing further deepening of the research and more complete systematization of the obtained results.

**Keywords:** Electromagnetic Treatment, Cotton Seeds, Laboratory Germination, Root and Sprout Length, Root and Sprout Mass, Duration of Storage

**JEL Codes:** L60

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## **ELECTRONIC LOAD BASED ON ARDUINO NANO**

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**Abstract:** *The paper presents an electronic load with smooth current regulation, based on Arduino Nano. Such an electronic load is used for recording of the operating characteristics of DC power supplies, batteries and DC generators. Taking these characteristics is essential when assessing the energy efficiency and performance of a DC source. The use of transistors as a load significantly reduces the size of the module as well as the test time compared to conventional load resistors.*

**Keywords:** *microcontroller, electronic load*

**JEL Codes:** *L60*

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## TYPICAL LOAD CHARTS OF HOUSEHOLD ELECTRICITY CONSUMERS

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**Abstract:** *There are a lot of technical and economic reasons that have a continuous impact on the main indicators characterizing household electricity consumption. Therefore, it is necessary to have up-to-date information on typical load charts and their characteristic coefficients for typical groups of household electricity consumers. The obtained load schedules can be used in the design and operation of household electrical networks. They can also be used in modeling and forecasting household electricity consumption.*

**Keywords:** *household electricity load charts, specific indicators of household electricity*

**JEL Codes:** *L60*

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## LED INDUSTRIAL LIGHTING SYSTEMS AND THEIR INFLUENCE ON THE PARAMETERS OF THE ELECTRICAL NETWORK

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**Abstract:** The study of the electrical parameters of the lighting systems has been carried out for actually operating industrial sites. These are typical production facilities in the field of food industry; the brewing industry and the processing industry. The lighting systems are made with different luminaires with corresponding power and number. The measurement of the parameters is performed with precise network energy analyzers and by appropriate equipment for them - current transformers, laptop, etc. necessary equipment. The measurements for the different products have been performed for a period between 2 and 6 months. The measuring intervals are set to 5 minutes. All requirements of the current standards for electricity quality (series of standards EN 61000) as well as the normative documents in this field are met. The obtained data are summarized and presented in the respective graphic and tabular form. Relevant conclusions are drawn.

**Keywords:** LED, Harmonic pollution, LED drivers

**JEL Codes:** L60

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## REVIEW OF URBAN LIGHTING SYSTEMS AND OPPORTUNITIES OF THEIR EFFICACY CONTROL

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**Abstract:** Urban lighting systems are part of the main strategic assets of municipalities, they provide safe streets, public buildings and squares through continuous and trouble-free operation. Therefore, they are usually very expensive to operate and maintain, and consume an average of 40% of electricity costs in municipalities.

The energy efficiency of these outdoor lighting systems is determined mainly by the light sources used, as well as the introduction of modern systems for their management. The article provides an overview of the existing methods of managing urban lighting systems. Attention was also paid to their energy-efficient management by innovative modern methods.

Municipalities that create such innovative lighting systems can not only save up to 50% of energy, but also use the street lighting system as a basis for other smart city applications.

**Key words:** city light system, energy efficient lighting system, street light control.

**JEL Codes:** L60

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## **ANALISYS AND INVESTIGATION OF ADVANCED SOLDERING TECHNOLOGIES: A SHORT REVIEW**

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**Abstract:** *Current trends are for Restriction of Hazardous Substances (RoHS) and corresponding RoHS Compliant Technology. Soldering alloys and fluxes must be used in the manufacture of electronic products. The paper reviews existing methods of advanced soldering technologies and alloys. They are classified according to the melting temperature and their percentage of Sn. It has been studied that SnAgCu type alloys are suitable for surface mounting (SMD), but they are not particularly suitable for "wave type soldering" and manual soldering, as cavities may appear. Three- and four-component alloys with Bi are particularly promising. It is recommended to use the so-called matte tin (Matte Sn, Pure Sn) when soldering, as it does not show the appearance of "whiskers" in the solder under certain conditions. In the manufacture of electronic devices, they grow on the surface of light tin (Bright Sn) and its alloys deposited on copper as intermetallic compounds are formed  $\text{Cu}_6\text{Sn}_5$ ). They are due to vibration, electric field and moisture. Cleaning after soldering is one of the essential stages in the technological process of soldering electronic components with the help of Water Soluble Paste.*

*The main methods for soldering with RoHS pastes ensure their melting by blowing with hot air (Convection Reflow) CR or superheated steam (Vapor Phase Reflow) - VPR. In them, the temperature of the board on which the elements will be soldered must be changed in a specific way, called a soldering profile (Reflow Profile). It consists of four mandatory stages: Reheat Stage, Thermal Soak Stage, Soldering Stage and Cool Down Stage. To speed up the technological process, the boards should be cooled to room temperature as quickly as possible, but the rate of temperature reduction is important for the strength of the solders in case of repeated mechanical influences (Fatigue Resistance) and should not be higher from 10 °C/s. Relatively high soldering temperatures are a prerequisite for the occurrence of defects in the finished products, the most significant of which are: damage to elements sensitive to*

elevated temperature, the effect of "popcorn" (Popcorn Effect) in integrated circuits. peeling of tracks on the board, appearance of "whiskers", distortion and even peeling (Tomb-stoning) of soldered SMD devices, etc.

**Keywords:** Soldering Material and Alloy, Soldering Technologies, Electronic Board.

**JEL Codes:** L60

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## **ANALISYS AND INVESTIGATION OF HIGH-FREQUENCY FERROMAGNETIC MATERIALS: A SHORT REVIEW**

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**Abstract:** *The modern development of magnetic soft-ferrite materials and technologies leads to the design and production of highly efficient and compact electro-magnetic devices. They are widely used in the fields of measuring technology, automation, electrical engineering, electronics and others. Ferrites are ceramic materials composed of chemically bonded iron oxides and one or more metallic elements. Magnetically soft ferrite materials are characterized by relatively high saturation magnetization, low coercive intensity, small hysteresis curve area and respectively small over-magnetization losses. Determining the electrical and magnetic properties and characteristics of magnetic materials with high accuracy and in a wide frequency range is an important requirement for accurate modeling, design and research of various electrical and telecommunications devices. These characteristics depend on a number of factors such as frequency, temperature, homogeneity, isotropy and others. One of the sources of power losses in Mn-Zn ferrites is the losses from eddy currents. They increase with the increase in the frequency of the electric opol, which in turn is a trend in modern electronic and telecommunication devices. The losses of eddy currents in the core of the magnetic component depend on its electrical properties. In addition to conducting a magnetic field, ferromagnetic materials are used to ensure the electromagnetic compatibility (EMC) of electrical products through magnetic fields (at low frequencies) and to reduce the levels of eddy currents (at high frequencies). Shielding can be an effective means of reducing electromagnetic fields generated by a source, and is often built into the design of equipment to limit electromagnetic emissions. Screens for radio frequency and low frequency electric fields isolate the source through a conductive surface (Faraday cage). They are usually made of sheet metal or metal mesh, although other materials can be used, such as ceramic, plastic and glass, with one or more metal coatings or with a built-in metal mesh. Conductors and other waveguides used for radio frequency fields are equipped with a shield as a standard requirement. This is*

done in order to improve EMC by preventing the emission of radio frequency energy, which would lead to large losses, but also limit the size of the fields in the environment.

**Keywords:** Ferromagnetic Materials, High-Frequency, Soft Ferrite, Electromagnetic Compatibility.

**JEL Codes:** L60

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## **OPTICAL RECEIVING AND TRANSMITTING DEVICES FOR CONTROLLING BLOOD FLOW DURING HEMODIALYSIS**

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**Abstract:** *The aim of the present study is to present a prototype of an electronic system for recording blood loss by optical method, in the rupture of fibers on a dialyzed filter during manipulation. The presented photointeractor registers the presence of a volume of 0.1% erythrocytes, and the signaling time does not exceed 2s. The light indication and the audible alarm warn of detection and continue the loss of blood, including a "Bluetooth" module, notifying medical staff to a central prescription and a mobile phone. Integrated monitoring system in a hemodialysis machine, improving the current medical approach by implementing appropriate actions to prevent risks to the lives of patients during therapy..*

**Keywords:** *hemodialysis; electronic system; optical; blood flow; control.*

**JEL Codes:** *L10, L11*

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## REVIEW OF ACOUSTIC APPROACHES FOR QUALITY ASSESSMENT OF EGG DEFECTS

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**Abstract:** According to the rules on marketing standards for eggs, eggs may be classified as either Class A or Class B. Class A eggs must have the following characteristics: clean and undamaged shells of normal shape; air space inside the egg not more than 6 mm; yolk, which has no clearly visible contour and moves slightly when turning the egg; the protein must be pure and translucent; the egg must not contain foreign substances or odors; the egg must not show the development of microbes. Class B eggs are those that do not meet the quality thresholds for Class A eggs or are Class A eggs that are classified lower. Different researches have been done for the automation of identifying defected eggs by image processing technology and machine vision. These approaches are applicable when the defect of a broken egg shell is on the side of the image. Other approaches to grading eggs are acoustic, in which this problem does not occur. The article provides an overview of the systems for grading egg shell defects based on acoustic approaches. As well as their application for industrial purposes.

**Keywords:** egg defects, acoustic approaches, quality assessment.

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## **FRI-ONLINE-1-CCT1**

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### **LABVIEW AS A TOOL FOR LEARNING RECURSION**

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**Abstract:** The report describes an approach to studying recursion through its visualization. Various program implementations are considered and the possibility for using the LabVIEW environment in the process of training students in the discipline Synthesis and Analysis of Algorithms is analysed. In particular, attention is paid to the resources that LabVIEW has for the development, visualisation and step-by-step interactive management by the user of the implementation of recursive functions. Exemplary realisations of direct and indirect recursion are described (calculation of factorial, summation of  $n$  consecutive numbers, calculation of Fibonacci numbers, finding the greatest common divisor (GCD), recursive binary search, etc.). The conclusion states that the LabVIEW environment is suitable both for demonstrations and to learn the basic principles of recursion.

**Keywords:** Education, Algorithms, Recursion, Animation, LabVIEW

**JEL Codes:** C60, C61, C80, I23

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## DISTRIBUTED RING-BASED MUTUAL EXCLUSION WITH GRACEFUL DEGRADATION

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**Abstract:** Under "mutual exclusion" is understood exclusion of any opportunity more than one active object (process, thread) to access a shared resource at a time. The distributed ring-based (aka token-ring) mutual exclusion algorithm is the simplest decentralized algorithm of this kind. Its pros are simplicity and minimalistic preliminary information required to be known from each system process. The main drawback of this attractive algorithm is strong presumption of full system reliability which makes it impractical. After all, the failure model of distributed systems itself assumes that failures should not be treated as exceptions but as a norm.

In [5] is described a fault-tolerant version of the classical distributed ring-based mutual exclusion algorithm without communication ring reconfiguration (Scheme 1). Here is described a modified version of that algorithm (Scheme 2) with special kind of ring reconfiguration - graceful degradation. Both schemes guarantee failure recovery from any kind of multiple faults, and thus eliminate presumption of full system reliability. In case of process failure in the Scheme 1, its recovery is awaited. Only then begins the recovery of the whole system. With the Scheme 2 proposed here the recovery of the whole system begins right when a process failure is detected. This is at the expense of excluding of the faulty process from system configuration, and leads to its graceful degradation. Such a scheme of operation is appropriated in the case of absence of spare processes.

**Keywords:** Distributed Systems, Fault-tolerance, Failure Recovery, Mutual Exclusion, Token-Ring

**ASJC Codes:** 1701, 1712

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## A REVIEW ON THE MODIFICATIONS OF THE K-NEAREST NEIGHBOR ALGORITHM

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**Abstract:** *The implementation of machine learning in businesses, and in particular small and medium businesses, depends to a large extent on the ability of managers and decision-makers to understand the used algorithm. Faced with the need to make a decision concerning their company, many managers are sceptical to trust a system they don not understand. That is why one of the keys for the successful implementation of machine learning in business is the interpretability factor.*

*This publication reviews one of the most popular, easy-to-understand, and preferred machine learning algorithms - the K-Nearest Neighbor. Although the algorithm has proven to be useful and accurate, it has some serious drawbacks and shortcomings that many authors have explored and researched. This publication is a study of some of the most significant modifications of the traditional KNN algorithm and the problems they solve. The reviewed modifications are classified by:*

- *The problem they are solving*
- *The main idea of the modification*
- *Positive characteristics of the modification*
- *Negative characteristics of the modification*
- *Area of application*

**Keywords:** *Machine learning, K-nearest neighbor, KNN*

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## TEACHING OPERATING SYSTEMS: DEADLOCKS

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**Abstract:** *Process Synchronization and Deadlocks are some of the toughest topics of Operating Systems and Computer Science in general. It is necessary to solve a lot of exemplary tasks just to strengthen the understanding of the concepts but they still remain difficult to grasp by the students. A set of highly interactive, integrated tools has been designed specifically to support both teaching and learning Operating Systems at the University of Ruse. This paper presents a brief description of the Deadlock problem as well as the features of the basic teaching tool used in the Operating Systems course. This tool allows the students to develop and run concurrent programs in two simple programming languages and to monitor the information in the main system tables. A concise and relatively self-contained description of how the tool has been used to help students understand the concept of Deadlock and in particular Deadlock Prevention is given.*

**Keywords:** *Operating Systems, Teaching Tools, Deadlocks, Concurrent Programming*

**JEL Codes:**

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## TEACHING CRYPTOGRAPHY AND DATA SECURITY: SIMPLIFIED DES ALGORITHM

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**Abstract:** *Although a lot of symmetric ciphers have been developed since the Data Encryption Standard (DES) was introduced, and although it is replaced by the Advanced Encryption Standard (AES), teaching DES plays a substantial part in every Cryptography and Data Security course, because the study of DES provides an understanding of the fundamental principles used in symmetric block ciphers at all. Due to the complex structure of the full DES, for teaching purposes a simplified version is usually used. It allows the student to perform encryption and decryption by hand and gain a good understanding of the working of the algorithm details. The paper describes the approach used in teaching of the Simplified DES (S-DES) at Computer Systems and Technologies department of Ruse University and the especially developed educational tool for learning and testing purposes.*

**Keywords:** *cryptography, block ciphers, DES, S-DES, teaching tool*

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## DEEP LEARNING BASED FACE RECOGNITION SYSTEM WITH SMART GLASSES

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**Abstract:** A key element of a system that supports people with visual impairments using augmented reality glasses is the creation of a system for recognizing faces and objects. The system is created with a single purpose, and it is to help people with visual problems more easily perceive their environment and reduce the social distance between them and ordinary people. To be able to create such a system, it is necessary to create a model through which faces, and objects can be detected and recognized and through sound reproduction of their labels (names) they are transmitted to the user. The creation of such a model requires the use of artificial intelligence and in particular neural networks.

**Keywords:** Augmented reality glasses, Visual Impairments, Artificial Intelligence, Neural networks.

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## BRAIN COMPUTER INTERACTION WITH EMOTIV INSIGHT HEADSET

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**Abstract:** The paper reviews brain computer interaction and the Emotive insight headset as a means of emotion recognition. The paper is divided into three parts, the first describes the ways of emotion recognition and the importance of this new type of communication, the second describes the emotive insight headset and the software with which the recognition and processing of signals, and the third part give suggestions for use in the daily activities and life of the average user.

**Keywords:** HCI, BCI, Emotiv Insight Headset

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## INTELLIGENT COMPUTER SYSTEMS: OVERVIEW

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**Abstract:** *Intelligent computer systems are already "rooted" in our daily lives, tangible and intangible, helping to diagnose problems, predict, and search for information and software robots on the Internet, linguistics, speech recognition, games, and more. Nevertheless, there is still a need for existing systems to be improved and refined and develop and implement new functionalities. The paper presents an approach for systematization of the functionalities of intelligent computer systems and appropriate methods and approaches for their development.*

**Keywords:** *Artificial Intelligence; Intelligent Systems; Emerging Technologies; Education*

**JEL Codes:** *L10, L11*

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## OBSERVATION OF THE PRACTICAL TRAINING WITH THE STUDENTS OF SPECIALTY COMPUTER SYSTEMS AND TECHNOLOGIES

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**Abstract:** The COVID-19 pandemic impacted all areas of community life, with education being one of the most affected. Delivering practical training in a pandemic setting was and remains a serious challenge. In order to find the right approach, it is necessary to follow the progress of the process. Students' feedback is one of the approaches to achieve better results. The paper presents the results of the survey conducted on the practical training with the students of the specialty "Computer Systems and Technologies" in the last two years. The results were compared and analyzed, and the progress of the trainees during this period was monitored. The questions in the survey include the students' opinion about the organization of the practical training, the planning of the topics and tasks, as well as the participation of students, lecturers and specialists from the training institution. We receive useful feedback on how to assess the skills acquired during the practical training and what knowledge and skills will be useful to future engineers so that they are provided for in the training to facilitate their realization in the labor market. The formulated conclusions provide guidelines for the development of practical training in times of crisis.

**Keywords:** Practical Training, e-learning, Distance Learning, Survey

**JEL Codes:** I20, C88

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## INFORMATION SYSTEM SUPPORTING THE ADMINISTRATIVE SERVICE IN THE MAYORALTY OF A VILLAGE

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**Abstract:** The advancement of information technology has led to the widespread use of information systems (IS) in all areas of human activity and especially in corporate and management structures, making them function more efficiently. At the present stage, the activity of the latter is inconceivable without IS, which support the managers and employees in solving problems or in making management decisions. However, in a large part of the villages in the country, the administration of the mayoralty still does not fully use such systems. Each municipality uses several different software products concerning different aspects of the administrative service of the residents and the mayoralties of the small settlements have access to their resources. However, there are situations in which the mayor's administration does not particularly benefit from them. The first reason is that sometimes the mayor needs specific information for decision making, and such information is not available in the municipal IS. The second reason is that in order to have access to the latter, the mayoralty in the village needs a reliable and high-quality Internet connection. It is well known that in the villages the problems with the connection are frequent, and the interruptions in the power supply (bad weather conditions, accidents) are just as frequent. The paper discusses the process of design and implementation of a local IS, in accordance with the specifics of the tasks being solved by the mayor's administration, especially in an epidemic situation. The system allows data entry and queries on various criteria for the properties in the village and their permanent and temporary residents, protected tree species, farm animals, as well as for quarantine of people and farm animals.

**Keywords:** Information System, Information System Design, Taxonomy, Administrative Services, Mayoralty

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## STRATEGIES FOR MOTIVATING PLAYERS IN VIDEO GAMES AND THEIR APPLICABILITY TO EDUCATIONAL GAMES

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**Abstract:** *In the midst of the digital revolution, the massive digitalization of all areas of human activity and the advancement of digital technologies, video games in all their formats and genres are a leading entertainment industry. As a form of entertainment, especially among the younger generation, they are already displacing not only television, cinema and music, but also social networks. According to the latest data, the gaming industry globally reaches a value of over \$ 300 billion, and the new formation of users seeking social communication in the gaming space drives it to expand to a new level. And while video games are becoming more and more Immersive, engaging, and motivating, educational games are still looking for a successful strategy to transform the learning process into an engaging experience for the students. Among the reasons for the poor success of educational games is the inability to be provided sufficient funding to create an attractive highly interactive environment, competitive with video games. Another reason is the lack of symbiosis between educational and gaming components in the game, and exploiting the game element as a form of reward after the completion of the training part, which places the latter still in the area of boring activities. In the majority of educational games there is no storyline with characters and avatars, which generally helps to build a personal connection with the game. Another reason that can be pointed out is the poorly designed reward system in educational games, the latter being, as discussed below, a major factor in motivating, engaging and holding the attention and interest. In a successful educational game, the learning material must be woven into the most intriguing parts of the game and presented as a valuable asset to the player. This requires analyzing the way players perceive video games, what attracts, challenges, encourages and engages them in a game to continue the interaction with it. The paper examines the motivation and engagement in the context of Self-Determination Theory, focusing on extrinsic and intrinsic motivation and how they intertwine to drive a person to develop and upgrade his skills and competences. The strategies for engaging and holding the interest of the players in video games and their influence on the motivation are considered in the same context. Based on the performed analysis and taking into account the general specifics of the educational game, a model of a reward system is proposed, which would provoke and encourage more active and intrinsic motivated interaction.*

**Keywords:** Educational Games, Video Games, Motivation, Engagement, Reward System

**JEL Codes:** I20, I21

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## METHOD FOR MEASURING INFORMATION OVERLOAD

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**Abstract:** Information exchange between members of an organization or company, as well as within teams and communities of practice working on certain tasks, is an important element of their activity. This exchange is a necessary part of knowledge management in the organization, especially when it produces technological products. Making right decisions depends on knowledge gathered through different communication channels to a high extent. Insufficient and extra information can negatively affect the quality and results of decisions. There is no general methodology for estimating information load. Our goal is to provide a model for measuring information loads in teams or organizations, sharing knowledge between their members, and associated consequences of making the right decisions. Give an assessment of the quality of the information exchange and indicate whether it needs to be improved.

**Keywords:** Knowledge Management, Information Overload, Measurement, Methodology

**JEL Codes:** C83, D81, D83

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## WEB BASED LEARNING TOOL OF CYCLIC CODE ENCODING

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**Abstract:** This paper presents a developed web-based interactive tool for studying of cyclic code encoding. The purpose of the application is to help students to learn the complex processes of coding in cyclic code. The application represents two approaches for coding in cyclic code - polynomial and LFSR (Linear-feedback shift register). The maximum binary combination that can be encoded with the application is 26 bits, and students can detect double or triple errors. An important component of the application is the interactive algorithm (block diagram), which follow the process step by step and notifies in case of wrong actions. Statistical information is collected for each solved task, which is used to assess the work and the progress of the student. The developed application is part of the virtual library of the discipline "Reliability and diagnostics of computer systems", which is studied by students in the department "Computer Systems Technology" at the University of Ruse "Angel Kanchev". At the end of the report the results of the conducted survey for the opinion of the students about the developed application are presented and discussed.

**Keywords:** cyclic code, LSFR, polynomial, error detecting, error correcting, learning tool, interactive model, JavaScript, konvaJS, html5

**JEL Codes:** I23, D83, L86

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## **APPLICATION OF SMART CARDS IN PERSONALIZED EDUCATION SOFTWARE AND ATTENDANCE TRACKING**

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**Abstract:** *The paper explores possible uses of smart cards in the context of a modular, personalized learning system. Personalized learning has been steadily increasing in demand, especially during the last few years' events and the shift towards online learning in all levels and stages of education. It entails flexibility and adaptivity of the learning system and content to each individual learner's needs. As a consequence, personalized learning systems require reliable authentication methods to successfully identify the learner and tailor the learning experience accordingly. Smart cards and public key cryptography have been widely adopted for a lot of uses, such as access control, payment applications, digital document signing, used as identity documents and as an alternative or in addition to traditional authentication methods (e.g., password-based authentication). The paper discusses their use as a quicker, simpler and more interactive method of authentication, collection and storage of relevant data, and subsequent personalization of learning systems. Possible architectural designs, several implementation variants and a proof of concept are also introduced.*

**Keywords:** *Personalized learning, smart card, authentication, interactivity*

**JEL Codes:** C88

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## USING WORD CLOUDS FOR FAST IDENTIFICATION OF PAPERS' SUBJECT DOMAIN AND REVIEWERS' COMPETENCES

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**Abstract:** *Generating word (tag) clouds is a powerful data visualization technique that allows people to get easily acquainted with the content of a large collection of textual documents and identify their subject domains for a matter of seconds. Instead of reading many files, their content could be automatically extracted and processed, so that only the most significant terms are retained and presented in a form of a word cloud. Usually the most significant and frequently appearing words are visualized in different colors and higher font sizes so they catch attention immediately.*

*This technique could be quite useful in conference management systems as well, enhancing at least two important processes – invitation of suitable reviewers to join the Program Committee (PC) and the manual assignment of reviewers to papers.*

*Multidisciplinary conferences usually maintain similar Program Committee during the years. It contains reviewers (almost) evenly distributed in all topics covered by the conference. However, the distribution of submitted papers in thematic fields and conference topics could not be predicted. It is possible to have plenty of submitted papers in one topic and just a few papers in another. So the number of experts in the first topic should be many more than the number of experts in the second one. Otherwise the accuracy of the assignment may get significantly lower. To prevent that, PC chairs could generate a tag cloud, built from the abstracts of all submitted papers in order to identify the most commonly selected conference topics, and then invite reviewers in those subject domains with higher priority.*

*In most cases the assignment of reviewers to papers is done automatically, but sometimes there are papers that need to be reassigned manually. To perform an accurate manual assignment, the PC chairs should know the areas of expertise of all reviewers, which is actually not possible. To facilitate the process and increase its accuracy, PC chairs could generate a word cloud for each reviewer, built from the abstracts of his/her publications available on the Internet. This is a fast and easy way to identify the areas of research and expertise of a reviewer. All abstracts are freely available on the Internet and could be automatically obtained by publication indexing services such as Semantic Scholar, DBLP and others.*

**Keywords:** *Word Clouds, Conference Management, Assignment of Reviewers to Papers*

**JEL Codes:** *L86, C8, D7*

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## USING SEMANTIC NETWORK AS MEANS OF DATA MODELING IN THE NOSQL GRAPH STORES

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**Abstract:** Graph stores are especially important for applications where there is a need to analyze the relationships between objects or to provide access to graph nodes in a certain sequence (graph traversal). Characteristics of this type of data warehouses are that they have a high degree of optimization in storing the nodes of the graph and the connections between them, thus ensuring efficient query management. Graph based repositories are useful for solving problems where there are complicated connections between objects, such as social networks, rule based data retrieval mechanisms, and systems that need to analyze complex network structures to find relevant patterns and templates. Graph stores are suitable when there are many elements that are connected to all the others in a complicated way and the relationships in turn have specific properties. With this type of storage, queries to neighboring nodes are simplified, and in-depth access is easily provided when matching templates are found. The graph data model can be formally represented as a directed graph. The semantic network is defined as a directed graph in which nodes and arcs (semantic links) are named. When converting it to a list of elements, it is necessary to decide when a node will be included as an element in the list and when a semantic link between nodes. In the proposed algorithm, this issue is solved by introducing in the definition of the semantic network the function, reflecting the priority of the semantic links.

**Keywords:** Graph data stores, NoSQL data models, Semantic network, Traversing algorithm

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## ANALYSIS OF STUDENTS' ACADEMIC PERFORMANCE IN PROGRAMMING RELATED COURSES AND THE EFFECT OF ONLINE TEACHING

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**Abstract:** *The paper investigates the correlation between marks earned by bachelor degree students in a number of different courses, related to programming, as well as the impact of online education, forced by the COVID-19 pandemic. The courses under investigation are "Programming", "Object-Oriented Programming" and "Programming Languages", studied by the same students in different semesters. For this analysis, only classical, in-class learning is considered. In a different set of data, the results of different students are compared, one group under in-class learning, and another - under online learning.*

**Keywords:** *Acquiring programming skills, Impact of forced online learning, Academic performance, Statistical analysis, Hypothesis testing*

**JEL Codes:** *C12*

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## **FRI-ONLINE-1-CCT2**

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### **WHY PLAN THE ATTRACTION OF YOUNG ICT TALENTS IN THE SCOPE OF THE TALENTMAGNET PROJECT**

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**Abstract:** Information and communication technologies (ICT) are a significant driver of economic development and generate jobs not only for the IT industry, but also for other sectors of the economy. Globally, the shortage of highly skilled labour in the field of ICT is increasing and this can affect economic growth. Although the number of ICT specialists in the EU grew more than 50 % from 2011 to 2020, over 9 times higher than the total employment increase during the same period, there is still ICT workforce shortage in all sectors. There are currently more than 350,000 vacancies for digital technology experts in the EU. The COVID-19 pandemic has contributed to a further increase in the demand for such specialists. That is why attracting and retaining such experts is a big challenge, especially in small towns and municipalities. To fill this gap, it is necessary that all stakeholders be involved actively and consciously by developing plans for attracting and retaining young ICT talents at the local level. The introduction of this article presents information on the increasing demand for ICT specialists in the EU and Bulgaria in particular. The paper presents a study of global challenges associated with the competition for ICT talent. The authors' conception of “Talent” and “Talent attraction management (TAM)” is outlined. A study of the factors for destination decision-making of ICT talents is presented. The need to develop a talent attraction and retention plan to enable successful competition for ICT specialists is analysed. Conclusions are made and recommendations for further work on the topic are proposed.

**Keywords:** ICT, attraction, retention, TAM, Talent attraction and retention plan

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## TECHNOLOGIES FOR ENHANCEMENT OF MANAGEMENT SUSTAINABILITY OF SMART GRIDS TO IMITATION ATTACKS

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**Abstract:** *The providing of high sustainability of electro-energy feeding system's management to remote cyberattacks is a very significant engineer problem, which could be successfully solved by applying of different technologies. Accounting this situation, in the paper the technologies for cybersecurity enhancement of the energy infrastructure management are analyzed and systematized. The substantiated conclusions could be useful in the development of the new smart grids.*

**Keywords:** *Cyberattack, Cybersecurity, Smart grid*

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## FORECAST ANALYSIS OF TRAFFIC LOAD IN TELECOMMUNICATION SYSTEMS BY ANFIS, FFNN AND GRNN

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**Abstract:** In this paper the research objective is the traffic load forecasting of the stations (customer service queries) in Markov chain M/M/c. In connection with the predictive analysis, an approach for regression modeling based on Adaptive Neuro-fuzzy Interface Systems (ANFIS), Feed-Forward Neural Networks (FFNN) and Generalized Regression Neural Networks (GRNN) was performed. About the educational and engineering purposes, students and developers have the opportunity to solve scenarios of approximation tasks for different variations of the traffic indicators Average Arrival Rate and Service Time with application of Hybrid, Backpropagation and other training algorithms. The procedures showed a high degree of approximation between observed and predicted values in the synthesis of predictive neural models.

**Keywords:** Markov Chain M/M/c, Predictive Analysis, Customer Service Queries, ANFIS, FFNN, GRNN.

**JEL Codes:** L10, L11

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## EVALUATION OF IN-PERSON AND VIRTUAL INTERNSHIP LEARNING OUTCOMES IN PROFESSIONAL HIGHER EDUCATION

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**Abstract:** Study programs in Professional Higher Education Institutions typically have the mandatory internship, with defined learning outcomes and ECTS expressed workload. When an internship is performed in exchange for ECTS credit, it must be strongly related to an academic discipline with defined set of learning outcomes. The goals and therefore learning outcomes, differ depending on the educational level and year of the study. At large, internship learning outcomes in professional higher education belong to two general categories: study program-specific learning outcomes and generic academic and soft skills outcomes. In previous years, the need for the development of a virtual model of internship and a platform for its implementation, suitable for performing work-based learning in Higher Education Institutions, is clearly recognized as the response to Industrial revolution 4.0. Even more, the significance of remote work-based learning emerged with the Covid 19 pandemics that disturbed work placed and hampered the implementation of professional practices, internship schemes, and all other forms of work-based learning. While different virtual internship schemes are developed throughout the educational systems, the question arise what are the advantages and disadvantages in the learning outcomes achievement in such work-based learning models. Here we discuss learning outcomes in professional higher education from the position of both traditional in-person internship and modern virtual internship.

**Keywords:** in-person internship, virtual internship, professional higher education, learning outcomes

**JEL Codes:** L10, L11

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## AN APPROACH FOR COMPUTER AIDED DESIGNATION OF FREQUENCY CHANNELS

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**Abstract:** *The problems of the increased use of the frequency spectrum and its compaction are generally valid for all geographical areas subject to regulation. With the introduction of the 5G network, the concepts for IoT and autonomous cars, it will deepen more and more. Possible mitigation can be achieved by using computer-controlled stations/nodes with the ability to exchange information with a database and automated spectrum management software.*

*This report describes in general terms the data structure requirements and the criteria for determining the frequency and channels.*

**Keywords:** *Efficiency, Effectiveness, Spectrum management, Ffrequency coordination operational requirements*

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## IMPLEMENTATION OF SLAM NAVIGATION AND PATH PLANNING USING ROBOTIC PLATFORM EQUIPPED WITH LASER SCANNER AND ODOMETRY SYSTEM

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**Abstract:** *One of the most interesting tasks modern mobile robots are facing with are SLAM navigation and path planning. In order to move freely in space, mobile robots must be familiar with their surroundings. SLAM navigation is a computational problem when creating or updating a map in an unknown environment, while monitoring the position of the robot in it. Initially, this task was unsolvable, as the chicken-egg problem. We currently know several algorithms for solving the problem, at least approximately, in trackable time and for certain environment. SLAM algorithms are based on concepts in computational geometry and computer vision and are used in robot navigation, robot-based cartography and odometry for virtual reality.*

*Path planning tasks include avoiding walls, moving robot without falling down stairs, and more. The path planning algorithm would take these tasks as input and create speed and rotation commands to send to the wheels of the robot. Motion planning algorithms can manage multi-joint robots and perform complex tasks, such as moving objects.*

*Two scripts will be created in this report: for SLAM navigation and for path planning. ROS (robot operating system) will be used. The scripts will be executed on a mobile robot equipped with a laser scanner and an odometry system. The success rate of the robot to handle the tasks will be explored.*

**Keywords:** *SLAM navigation, Path planning, Laser scanner, ROS, Mobile robot*

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## TRANSITION FROM FACE-TO-FACE TO ONLINE LEARNING IN THE DISCIPLINE “MOBILE CELLULAR NETWORKS”

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**Abstract:** Last year with the COVID-19 pandemic everything was changed, including education. The lectures and exercises in the discipline “Mobile Cellular Networks” needed to be done online. This provoked the lecturer to use different software products to communicate, teach, and give students the opportunity to do exercises alone. For communication, classes, and consultations the platform BigBlueButton was used, and for tasks during exercises, MATLAB was chosen for a software program. The paper presents the advantages of the software products used in the transition to online training in the discipline “Mobile Cellular Networks”, examples covered in one of the topics, and the opinion of the students about the teaching methodologies applied in the educational process.

**Keywords:** Mobile cellular networks, MATLAB, Wireless propagation, Simulation

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## COMPLEX SIGNALS APPLICATIONS FOR CYBERSECURITY ENHANCEMENT OF COMMUNICATION SYSTEMS, EXPLOITING ELECTRICAL POWER LINES

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**Abstract:** The power line communication (PLC) systems could be successfully used for enhancement of cybersecurity of smart grids management. One promising approach in this research area is the exploitation of complex signals, which are partiallyly undetectable for the radio electronic intelligence of criminal or terrorist groups. Accounting this situation, in the paper a scheme for complex signals implementation in PLC systems is substantiated. The proposed scheme could be useful in the development of the new smart grids.

**Keywords:** Cybersecurity, Smart grid, Power line communication, Complex signal

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## **BUILDING A CENTRALIZED SMART CITY SYSTEM FOR URBAN MOBILITY MANAGEMENT AND SOLVING PROBLEMS RELATED TO PARKING AREAS, PUBLIC TRANSPORT AND ECO-TRANSPORT**

### **PART 1 - STRUCTURAL ELEMENTS AND PROTOCOLS FOR COMMUNICATION THROUGH REST API IN SMART CITY SYSTEM - PUBLIC URBAN TRANSPORT**

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**Abstract:** *The focus of this article is to consider the basic protocols of communication and all the building blocks of the entire hardware and software structure in the construction of Smart City System in public transport. The basic concepts of the names and the function of the individual building elements and their division (hardware + software) of the whole structure of two main subdivisions will be introduced, conditionally called Exterior and Interior. The need to create such a centralized system, which consists of many different software applications communicating via API (Application Programming Interface), data collection in the central database, performing the necessary computational actions on central servers will be considered. The structure of the communication protocols for data exchange via REST API, which are specifically developed for Smart City System - Public Urban Transport, will also be considered and the overall concept of data exchange between the individual hardware and software modules will be explained through these protocols.*

**Keywords:** *Smart City, smart solutions, public transport, eco transport, LoraWan network, API and central database, smartphone app, Android, iOS, Validators, Centralized system, Web applications, Servers, efficiency, GPS*

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## **BUILDING A CENTRALIZED SMART CITY SYSTEM FOR URBAN MOBILITY MANAGEMENT AND SOLVING PROBLEMS RELATED TO PARKING AREAS, PUBLIC TRANSPORT AND ECO-TRANSPORT**

### **PART 2 - ALGORITHMS FOR VALIDATION OF TRANSPORT DOCUMENTS IN SMART CITY SYSTEM - PUBLIC URBAN TRANSPORT**

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**Abstract:** *The focus of this article is to examine in detail all possible cases and their respective Validation Algorithms for the different types of Transport Documents from the Smart City Public Transport System. Two main scenarios will be considered, respectively, in the presence of an Internet connection (ONLINE VALIDATION), ie. when we have a connection through the REST API to the central servers and respectively a scenario, in the absence of an Internet connection (OFFLINE VALIDATION), when local validation must be performed from the available hardware in the vehicle itself. Also, all the principles set for structuring the data parameters in the Electronic PD (Transport Documents) and in the physical carriers for Subscription - Mifare plastic cards will be considered in detail, in which the basic information about the Subscription itself is recorded and read, namely number of trips, period of validity, accessible lines, subscription card holder / user.*

**Keywords:** *Smart City, smart solutions, public transport, eco transport, LoraWan network, API and central database, smartphone app, Android, iOS, Validators, Centralized system, Web applications, Servers, efficiency, GPS*

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## ANALYSIS OF THE LEAST SIGNIFICANT BIT SUBSTITUTION ALGORITHM FOR IMAGE STEGANOGRAPHY

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**Abstract:** *Steganography is a science focused on the information protection by hiding the secret data in different types of public media, mainly images and videos. This paper presents an overview of Least Significant Bit (LSB) substitution algorithm. The advantages of Least-Significant-Bit (LSB) steganographic data embedding are that it is simple to understand, easy to implement, and it results in stego-images that contain hidden data yet appear to be of high visual fidelity. The first part of the paper presents a brief analysis on the steganography algorithm. The next part of the paper presents Least Significant Bit substitution used to hide data on colored cover images. In current classical LSB substitution method, the data is hidden in sequence.*

**Keywords:** *steganography, cryptography, LSB embedding*

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**SOLIDWORKS IN DISTANCE LEARNING IN GRAPHICS ENGINEERING**

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**Abstract:** *The challenges of distance learning have necessitated changing and adapting teaching methods in universities. This change is particularly noticeable in technical disciplines, which use a lot of graphical information such as three-dimensional models, drawings, diagrams and more. One of the main general technical disciplines that is under pressure from the situation is "Engineering Graphics". In distance learning, the whole visualization of the taught material needs to be radically changed. The inability to show details and models to students leads to the use of other ways of three-dimensional visualization. CAD systems with a rich set of possibilities for modeling 3D objects are very suitable for this purpose.*

**Keywords:** *Distance Learning, Engineering Graphics, CAD systems, Graphical Information, 3D Objects*

**REFERENCES**

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## DISTANCE LEARNING IN ENGINEERING GRAPHICS - CORRECTION OF DRAWINGS

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**Abstract:** *The learning process with distance learning students is more special compared to their full-time and part-time colleagues. During the pandemic, distance learning became the only thing possible. Disciplines such as Engineering Graphics faced many challenges that had to be overcome quickly. Even greater difficulty lies in the fact that the teacher is not able to directly monitor the student's work and prevent the sustainable perception of the wrong approach in working with drawing tools. It would be very time consuming for both parties in the training process to provide the intermediate stages of the verification work. Therefore, it is preferable to complete the drawing in its entirety and then have it checked and returned for correction.*

**Keywords:** *Distance Learning, Engineering Graphics, Graphical Information, Correction*

### REFERENCES

Kamenov, K., Dobрева, A. & Ronkova, V. (2017). *Advanced Engineering Methods in Design and Education*. Material Science and Engineering, No 252, pp. 012033 – 37.

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## CONTEMPORARY METHODS OF TRAINING IN ENGINEERING GRAPHICS

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**Abstract:** The paper article analyzes the methods applied in the students training and education in the area of Engineering Graphics during the last several years. A comparison is made between different lecturing methods, the tools used for teaching in face-to-face, distance and hybrid learning and training mode. The results of the conducted trainings and education have been analyzed, their efficiency has been estimated.

**Keywords:** Methods, Education, Training, Engineering Graphics, Efficiency

**JEL Codes:** A30

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## ECONOMIC FEASIBILITY RESEARCH OF DESIGN PROCESS FOR NEW TECHNICAL PRODUCTS

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**Abstract:** The paper reviews and refines the concepts of direct and indirect costs. The basic rules for minimizing costs have been analyzed. The cost determination of new technical products, the different types of expenditures and their structure have been considered. The author team describes specific rules for minimizing costs. Conclusions and recommendations have been made.

**Keywords:** Economic Feasibility, Design Process, Developing New Products, Cost Determination

**JEL Codes:** Q49

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## **THEORETICAL INVESTIGATION OF MODIFIED WORM GEAR DRIVES**

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**Abstract:** *The paper reviews existing methods of calculation and theoretical analysis of modified worm gear trains. Different criteria for geometric and strength calculation and optimization of worm gears with globoidal worm and helical involute gear according to different research authors' team have been presented. The specific features in the theory of calculation and design of these gears have been emphasized. A methodology for calculation and optimization of these modified gear drives has been created, taking into account their specific characteristics and the potential capability of the Bulgarian industrial enterprises. Conclusions have been deduced.*

**Keywords:** *Modified Worm Gears, Design methodology, Optimization options.*

**JEL Codes:** *L10*

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## RESEARCH OF DRIVING SYSTEMS - CHALLENGES AND POSSIBLE SOLUTIONS

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**Abstract:** The paper reviews existing boundaries of application of mechanical drive systems. The significance of mechanical gear trains as main components of mechanical drive systems has been taken into consideration. The focus of the research has been orientated to gear sets and gear boxes, which have extremely wide application in automotive and mechanical engineering industry. Special attention is dedicated to the importance and the investigation of worm gears and their modifications. Conclusions have been deduced.

**Keywords:** Driving Systems, Mechanical Gear Trains, Gear Boxes, Worm gears

**JEL Codes:** L79

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## DESIGN METHODOLOGY FOR INVESTIGATING WORM GEAR TRANSMISSIONS WITH SIGNIFICANT DIMENSIONS

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**Abstract:** Geometric and kinematic parameters of worm gears have been studied. A database has been created, providing the relationship between the parameters calculated and analyzed. An original design and research methodology for determining the energy efficiency of worm gears has been developed. The results obtained are presented in a graphical way. A comparative analysis has been implemented. Conclusions have been deduced.

**Keywords:** Energy Efficiency, Worm gears, Design Methodology, Comparative Analysis

**JEL Codes:** L79

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## STRENGTH RESEARCH OF A GEAR FROM A CAR GEARBOX - PROCESSING OF THE RESULTS

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**Abstract:** *The paper is a continuation of a previous report, presenting the results of the processed research data. The processed results are the result of simulation-tested 3D models with CAD systems compared to the classical methods for strength calculation of involute gears according to ISO 6336 standard. The results of the stresses in the gears obtained by different methods are analyzed. The results of the different types of strength calculations are compared and conclusions are made.*

**Keywords:** gear, gearbox, CAD system, strength calculations

**JEL Codes:** L62

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## **INFLUENCE OF THE DESIGN FEATURES OF THE SHAFTS ON THEIR MECHANICAL STRENGTH**

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**Abstract:** The paper reviews strength research of shafts. An analysis of the influence of various design features on the strength of the shafts is considered. For the purpose of the research simulation analyzes of 3D models developed with the CAD system Solid Works are used. The different stresses at different sizes, loads and constructions of the shafts are considered. The results of the different types of strength calculations are compared and conclusions are made.

**Keywords:** shaft, strength calculations, CAD system,

**JEL Codes:** L621

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## METHODS FOR LEDS' LUMINOUS FLUX CONTROL

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**Abstract:** This paper presents an overview of methods for controlling the luminous flux and its spectral composition of LED luminaires. Applications of different power sources - both current and voltage sources are considered. It is desirable modern light sources based on LEDs to allow dimming the light output over a wide range – from zero to nominal value. When used power supply is adjustable constant current source by control of the value of forward current through LEDs it is possible to dim luminous flux and the spectral distribution of the lamp's radiation remains unchanged. This method for dimming is convenient when all LEDs are similar, connected in series and operate at the same current value. Different developed methods for luminous flux spectral characteristics control are presented too. They allow reducing the current through one LED or group of LEDs only. Thereby the total luminous flux can be dimmed by control the current's value of the power supply and by reducing the current through chosen LEDs only the spectral power distribution of the luminous flux can be changed depending upon the particular application. The methods are reliable, ensures stable spectral characteristics, easy for implementation and cheap.

**Keywords:** Power LEDs; LEDs' luminous flux control.

**JEL Codes:** L10, L63

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## METHODS FOR LEDS' THERMAL LOADING ESTIMATION

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**Abstract:** *This Design of LED luminaire demands precise thermal management calculations and investigations. Thermal management calculations allow estimating temperature distribution on the LEDs, metal – core printed circuit boards (MCPCB) and heat sink but often real results may be different and experimental investigations are obligatory. Three measuring methods for estimation LEDs' junction temperature variations at different operating conditions are presented – by thermocouple, by infrared camera and by employing the temperature dependence of LEDs' forward voltage drop. Application of IR thermography for the middle spectral region (8 - 13  $\mu\text{m}$ ) gives appropriated results. Suitable, cheap and reliable method for direct measuring LEDs' junction temperatures during operating of lighting equipment is proposed. It is based on the variations of forward voltage drop on LEDs' junction in dependence of junction's temperature. Recommendations about calibrations, calculations and junctions' temperatures evaluations are presented. Developed method allows achieving of reliable results “in situ” about thermal performance of LEDs using non expensive experimental equipment. Results of these investigations allow determining proper LEDs' regimes of operation.*

**Keywords:** Power LEDs; LEDs' luminous flux control, LEDs' thermal management.

**JEL Codes:** L10, L63

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## BENEFITS OF VIRTUALIZATION AND SOME PRACTICAL ASPECTS OF VIRTUALBOX VIRTUAL MASHINES

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**Abstract:** *The article discusses the benefits of virtualization in various fields such as education, e-services and cloud technologies. Some specific practical instructions are given when working with VirtualBox virtual machines.*

**Keywords:** Virtualization Technology, Virtualization in education, VirtualBox, Virtual Mashines

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## POPULAR FUEL CELL TYPES - A BRIEF REVIEW

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**Abstract:** Fuel cells (FCs) are well-known and very efficient devices that utilize the chemical energy of a fuel – most commonly of hydrogen, in order to generate electricity. Namely due to the high efficiency, as well as the compactness, stable operation under different conditions, high flexibility, and the low environmental impact, fuel cells are applicable in many sectors and are regarded as a potential replacement of internal combustion engines. Depending on the type and size, fuel cells can be successfully utilized in electronic devices; personal equipment; commercial back-up or surveillance systems; in all types of vehicles, as well as trains and ships; and for power and/or heat generation. There exist various types of fuel cells suitable for different applications which can be divided based on fuel and electrolyte type, operating pressure and temperature, electrical efficiency and other criteria. This research aims at briefly reviewing the basics of the fuel cell technology in order to highlight its benefits and reliability, as well as to mention and compare the most popular and widely used types. Additionally, the possible applications for each FC type are presented.

**Keywords:** Fuel cell, fuel, power, energy efficiency, harmful emissions

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## STUDY OF LIGHT RADIATION CHARACTERISTICS OF VEHICLE

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**Abstract:** The paper presents a study for determination of light radiation characteristics emitted from light vehicle. In the experimental results is shown the illuminated zone from headlights of vehicle in regime of low beam. Presented results shown the illuminated zone of the headlamps measured on the level of roadway. The headlights studied are: reflector headlight with light source H7 and plastic end panel, reflector headlight with light source H7 and glass end panel and xenon headlight with plastic end panel. An analysis was also made from what distance the driver can perceive crossing pedestrian, dressed with dark clothes, light clothes and clothes with with reflective element.

**Keywords:** Headlight, illuminated zone, low beam, pedestrian

**JEL Codes:** L91, N70

### REFERENCES

Lyubenov D., Gelkov J., (2017) Analise and reconstruction of traffic accidents, Ruse, RU Angel Kanchev, (*Оригинално заглавие: Любенов Д., Гелков Ж., 2017, Анализ и реконструкции на пътнотранспортните произшествия, Русе, РУ Ангел Кънчев.*).

Regulation № 8 on the Economic Commission for Europe of the United Nations (UN / ECE)-Uniform provisions concerning the approval of headlamps for motor vehicles emitting an asymmetrical house or a driving beam or a combination of two fitted with halogen filament lamps (of categories H1, H2, H3, HB3, HB4, H7, H8, H9, HIR1, HIR2 and / or H11);

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## **USING OF ALTERNATIVE BIOFUELS AS A FUEL FOR ICE**

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**Abstract:** *The paper presents a study of possibilities for using of alternative biofuels as a fuel for internal combustion engines. In the paper are discussed deferent type of alternative biofuels (biogas, upgrading biogas, biomethan and ets.) that can use in engines. The characteristics of the different biofuels are considered and is made comparative analysis of the possibility of their use as a fuel for ICE. Are reported the advantages and disadvantages of biofuels of their use as a fuel.*

**Keywords:** *Biofuels, engines, biomethane, biogas*

**JEL Codes:** *L91, N70*

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## CONTENT OF NITROGEN OXIDES IN THE EXHAUST GASES OF A DIESEL CAR IN REAL OPERATING CONDITIONS

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**Abstract:** *The conditions under which the emission of toxic components in the exhaust gases of cars is determined differ from the actual operating modes. The most significant are the differences in the dynamics of the acceleration processes, the temperature state of the engine and the parameters of the environment. This gives grounds for expected differences between the values declared by the respective eco-standard and the actual levels, in the direction of their actual increase. The purpose of the research is to determine the content of nitrogen oxides in the exhaust gases of a diesel car under slowly changing operating conditions close to those of the EURO eco-standard and artificially simulated conditions of extreme acceleration process. The experiments were performed for different diesel cars, with different levels of exhaust gas cleaning in accordance with the eco-standards to which they meet. Conclusions are made about the high level of neutralization of nitrogen oxides in the exhaust gases of vehicles with catalytic reduction, meeting the highest requirements of the standard EURO 6D - TEMP*

**Keywords:** *Nitrogen oxides, Toxic components, Exhaust gases, Diesel car, Eco-standard, Standard EURO 6D-TEMP*

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## COMPARATIVE ANALYSIS OF THE INTERNAL NOISE LEVELS OF AN ELECTRIC VEHICLE AND VEHICLE WITH ICE

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**Abstract:** The paper reviews one of the methods for measuring internal noise from vehicles. The measurement is performed with an electric vehicle and a vehicle with gasoline ICE. The noise measurement is made at differen speed and on two types of road surface (smooth and coarse – grained). The obtained data shows the difference in the noise levels at equal road conditions for the two vehicles at different speed. The results are shown in graphical and tabular form.

**Keywords:** vehicle noise, noise emission, internal noise, road surface, dBA

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## ALGORITHM FOR COMPUTER AIDED PARAMETRIC ARRAYS DESIGN OF ASSEMBLIES AND AGGREGATES IN THE AUTOMOTIVE INDUSTRY

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**Abstract:** The use of widespread industrial software products for computer aided parametric arrays design of assemblies and aggregates in the automotive industry goes through two stages - creating an algorithm (general plan) for solving the problem and creating a software that takes into account the specifics of each specific practical task. This report contains the results of the work done to create an algorithm for computer aided parametric arrays design of assemblies and aggregates in the automotive industry. Based on the algorithm, using Microsoft Excel and SolidWorks, a software was created for parametric arrays design of discs for clutches and brake discs for wheel brakes.

**Keywords:** algorithm, computer aided design; parametric array;

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## COMPARATIVE ANALYSIS OF CARBON EMISSIONS, DISPOSALS IN THE PRODUCTION AND RECYCLING OF LITHIUM-ION BATTERIES

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**Abstract:** The paper summarizes the results of research on the carbon emissions of different types of lithium-ion batteries and the energy required for their production. This is necessary in order to be able to realistically assess the extent to which electric vehicles are relevant to carbon emissions throughout their life cycle. This will really assess their share in terms of their impact on global warming and the extent to which they have an advantage over conventional cars. Summary data on the energy required for the production of different types of batteries and emissions are presented based on data published in over 60 publications on this topic. An analysis of these data has been made and a recommendation for further research in this direction has been made.

**Keywords:** Li-ion battery, Life Cycle Assessment, Efficiency, Energy Consumption

**JEL Codes:** L10, L11

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## ANALYSIS OF EXHAUST AFTERTREATMENT SYSTEMS FOR VEHICLES

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**Abstract:** The article analyzes the efficiency of the use of systems for additional processing of exhaust gases. These systems are installed with the main purpose of vehicles using fossil fuels to reduce to a certain extent the content of harmful to global warming emissions contained in the exhaust gases. The analysis is based on publications published in recent years related to the study of achievements in the field of reducing carbon and nitrogen oxides and fine particulate matter. A quantitative assessment has been made of the efficiency of the systems for additional processing of the exhaust gases obtained from the combustion of fossil fuels.

**Keywords:** Exhaust Aftertreatment Systems, Energy Consumption

**JEL Codes:** L10, L11

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## CAPABILITIES OF SOFTWARE PRODUCTS IN MODELING REAL ENGINES PROCESSES

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**Abstract:** *The paper reviews existing commercial engine simulation software packages used to generate an estimation of the combustion and gas flow parameters occurring inside the engine's cylinder. Based on these estimations further advanced research is done on fluid flow, heat transfer and the geometry of the engine. In recent years the automotive industry has been investing a lot of effort and resources into improving engine performance and fuel consumption while reducing the pollutant emissions that the engine produces. Various packages have been developed over the years, all similar in purpose and functionality. Detailed input parameters are required to simulate the processes in the engine.*

**Keywords:** *ICE simulation software, CFD,*

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## CAPABILITIES OF SOFTWARE PRODUCTS IN MODELING REAL ENGINES PROCESSES

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**Keywords:** ICE simulation software, CFD

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## INFLUENCE OF THE WEAR OF THE CONTROL VALVE ELEMENTS ON THE CHARACTERISTICS OF COMMON RAIL INJECTOR

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**Abstract:** *The geometrical position of the control valve changes at the time of exploitation, as a result of wearing, which leads to a change of residual electromagnetic gap, stroke and force of control valve spring. The study measures the hydraulic characteristic changes, based on common rail injector increased stroke of control valve, residual electromagnetic gap and variation of spring tension. Summarized data from various studies are presented,*

**Keywords:** *valve seat, ball and spring, wearing, hydraulic characteristic.*

**JEL Codes:** *L10, L11*

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## HYDROGEN FUEL CELLS AS AN ALTERNATIVE TO CONVENTIONAL FUELS

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**Abstract:** In the presented article an analysis is made of the possibilities for replacing ordinary fossil fuels with hydrogen fuel cells. In the latter years, the pollution of the atmosphere with CO<sub>2</sub> is increasing, and this, according to the “greens” leads to catastrophic climate change! The use of „Bio“ additives (biodiesel, various alcohols, etc.) does not reduce the amount of CO<sub>2</sub> and other toxic components. Real alternative to traditional hydrocarbon fuels is hydrogen. It is available in huge quantities and can 100% replace them. The only problem is that its direct use in normal internal combustion engines is not so easy! The use of hydrogen fuel cells converting hydrogen energy into electricity can give impetus to the development of electric vehicles; this will probably reduce the internal combustion engine and lead to the preservation of the environment. Fuel cells are not limited by the maximum efficiency of the Carnot cycle. Therefore, they can have a very high efficiency in converting chemical energy into electrical energy. The fuel cell converts the chemical energy of its fuel into electricity with an efficiency of about 50%, which is about 5% more than an internal combustion engine. From this it can be concluded that in place of traditional internal combustion engines will come vehicles equipped with hydrogen fuel cells, as long as a cheap and reliable way for the produce and storage of hydrogen.

**Keywords:** Hydrogen, Fuel cells, Environment, Petroleum fuels, Substitutes

**JEL Codes:** Q30, Q40, Q50

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## APPLICATION OF SOFTWARE PRODUCTS FOR MODELING SPARK IGNITION ENGINES

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**Abstract:** In recent years, many automotive companies and research laboratories have invested more and more money in developing or purchasing software to develop their new engines. Over time, the simulation software gives better results that come close to real engines. This can limit some of the experimentation and in turn, reduce production costs. The paper reviews some of the existing software for modeling and simulation of gasoline spark-ignition engines.

**Keywords:** Spark Ignition Engine, Engine Simulation, Modeling, Predicting, Model

**JEL Codes:** L10, L11

### REFERENCES

- Marinov, M., & Iliev A. (2003). *Theoretical and experimental model of diesel engine piston with coating*. ESFA 2003, Fuel economy, safety and reliability of motor vehicles, Bucharest.
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## APPLICATION OF SOFTWARE PRODUCTS FOR MODELING SPARK IGNITION ENGINES

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**Abstract:** In recent years, many automotive companies and research laboratories have invested more and more money in developing or purchasing software to develop their new engines. Over time, the simulation software gives better results that come close to real engines. This can limit some of the experimentation and in turn, reduce production costs. The paper reviews some of the existing software for modeling and simulation of gasoline spark-ignition engines.

**Keywords:** Spark Ignition Engine, Engine Simulation, Modeling, Predicting, Model

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## **SAT-ONLINE-1-SITST**

### **SAT-ONLINE-1-SITST-01**

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## **DEVELOPMENT OF THE PHYSICAL INTERNET CONCEPT AND PERSPECTIVES FOR APPLICATION IN TRANSPORT AND LOGISTICS**

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**Abstract:** *The paper considers the concept of the Physical Internet (PI). This is a new interdisciplinary concept for logistics and transport, which includes different areas of research and the perspective for its application requires a systematic approach. There is no exhaustive theory about it at this early stage of its development. Based on the review and analysis, a framework is proposed that outlines the possible applications of the Physical Internet in logistics and transport to achieve higher productivity, efficiency and sustainability of supply chains.*

**Keywords:** *Physical internet, PI, transport, logistics, supply chain*

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## RECENT CYCLING MOBILITY TRENDS OBSERVED IN THE CITY OF BOLOGNA

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**Abstract:** Sustainable Urban Mobility Plans (SUMP) aim to provide a significant contribution to reaching the European climate and energy targets set by EU institutions. Furthermore, they aim to improve: transport efficiency and cost-effectiveness for both persons and goods; safe, secure and seamless transport; accessibility to/from key destinations and services; the development of an inclusive, equitable and resilient transport system and society. Measures regarding cycling mobility are typically recommended among the most important ones to plan and be implemented, under a multimodal perspective, in order to achieve the goals defined by SUMP. Cycling mobility is taken into particular consideration by the SUMP elaborated for the city of Bologna, where 16% of the trips performed by car cover less than 1 km and 33% of them is between 1 km and 5 km long, according to the data provided by the Municipality of Bologna. Indeed, cycling mobility is expected to assume an increasingly important role in the future development of transport system in the city of Bologna and in many other European cities as well. In this research, some recent trends are presented and discussed, with regard to the cycling mobility in the city of Bologna. Data are available as a result of a series of counting and monitoring activities conducted for more than 10 years, up to now. They also account for the response of bike flows to the limitations imposed by the pandemic crisis to several social and economic activities. In general, observed data can prove to be useful for interpreting current mobility patterns and emerging trends and thus for supporting decisions by urban transport policy makers.

**Keywords:** sustainable transport, bike transport, SUMP, traffic counts

**JEL Codes:**

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## ASSESSMENT OF ANY INDICATORS DETERMINING THE DISCIPLINE AND RESPONSIBILITY OF THE PARTICIPANTS IN THE ROAD TRAFFIC

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**Abstract:** *The object of study is the traffic load at the crossroads between the boulevards "Kliment Ohridski" and "GM Dimitrov" on the territory of Sofia. For the purpose of the study, a method was used to study the parameters of traffic by one observer. It allows their determination by aerial photography using an unmanned aerial vehicle of transport flows, and analysis of the results obtained. In addition, it is possible to obtain information on delays, throughput, determining the correspondence between the entrances and exits of the investigated intersection and other indicators of traffic. The main advantage of the ability to process video images taken by an unmanned aerial vehicle is that they are taken above the road instead of on the road. The successful implementation of such solutions for research and analysis of road traffic would only lead to better traffic organization, optimal traffic flow through intersections, which allows to significantly reduce the harmful effects of road use in cities.*

**Keywords:** *Unmanned aerial vehicle, Crossroads, Road traffic indicators*

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## TRAFFIC FLOWS PASSAGE OPTIMIZATION THROUGH A LIGHT REGULATED CROSSROADS IN THE TOWN OF PLOVDIV

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**Abstract:** Traffic management in large cities is a task related to the implementation of many activities, which include the study of traffic and pedestrian flows in places with problems in their passage, identifying activities to solve the observed problems and implementing actions to implement decisions. One of the ways to solve the tasks aimed at facilitating the passage of traffic flows through light-regulated intersections is the application of proven algorithms for optimizing the duration of light signals. This publication presents the possible application of such an algorithm at one of the busiest intersections in the city of Plovdiv.

**Keywords:** Traffic flows, Traffic research, Traffic lights, Waiting time.

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## IMPROVING THE CONDITIONS FOR PASSING THROUGH A CROSSROADS IN THE CITY OF SOFIA WITH HIGH TRANSPORT LOADS

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**Abstract:** The main purpose of the publication is to present one of the possible options for improving the conditions of passing through an intersection with high traffic load. The option for implementation of traffic lights at a specific intersection in the city of Sofia, regulated with road signs for priority, has been assessed. Public transport vehicles also pass through the intersection, which is the reason for changing the road with an advantage in it. This is one of the prerequisites, given the intensity of incoming traffic flows, for the formation of queues of cars in the peak periods of the day, which interfere with its normal functioning. Implementation of the decision to implement traffic lights is expected to achieve benefits of different nature in environmental, psychological and time-saving terms.

**Keywords:** Traffic flows, Traffic research, Traffic lights, Waiting time.

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## APPLICATION OF A DIFFERENT PEDESTRIAN IMPACT MODELS TO THE DETERMINATION OF IMPACT SPEED

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**Abstract:** This paper presents different models for determining the speed of vehicles at the time of impact depending throw distance of the body in a road accident with pedestrians. The applicability of the considered mathematical models has been established by a real example from the expert practice. Experts must know the specifics of the presented dependencies and depending on the type of vehicle, the mode of movement, the mechanism of the accident and the physical data of the pedestrian, should make a correct choice of mathematical dependence.

**Keywords:** Pedestrian Accidents, Pedestrian Impact Models, Impact Speed

**JEL Codes:** L91

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## ALGORITHM, USED IN THE INVESTIGATION OF PREVENTION OF A TRAFFIC ACCIDENT WITH THE PARTICIPATION OF A PEDESTRIAN

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**Abstract:** *The intensive development of road transport in recent decades has helped the society to meet its ever-increasing need of vehicles, on the one hand, but it has also led to a number of negative consequences, associated with the occurrence of road traffic accidents, on the other hand. In this regard, the problems, concerning traffic safety, and the tasks for their solution are the subject of in-depth research and analysis. This requires the use of adequate approaches in the study of the causes, conditions and factors which contribute to the occurrence of road accidents. In the present research the author proposes an approach for solving problems, related to the study of the possibilities for prevention of a traffic accident with a pedestrian. The application of this approach can be further used for solving various tasks, related to determining the basic parameters needed to establish the actual mechanism and the causes of an accident.*

**Keywords:** *Keywords: road traffic accident, automobile, pedestrian, velocity, danger zone, road, time*

**JEL Codes:**

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## GRAPHO-ANALYSIS ANALYSIS OF THE MOVEMENT OF A VEHICLE, INCLUDING THE PROCESSES: ACCELERATION, MOTION AT A CONSTANT SPEED AND STOPPING

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**Abstract:** A large number of road accidents occurring in the living areas in Bulgaria are when accelerating cars and traveling short distances. This type of accident is typical in the areas of intersections and in the areas just before footpaths, when cars have stopped or are moving at very low speeds. In most cases, this type of car movement is performed through three processes: acceleration; motion at constant speed and braking. These processes are characterized by different parameters - acceleration, braking delay, etc., due to which the speed that cars can reach is different. The goal of this paper is to perform a graph-analytical analysis of the movement of a car, including the process of: acceleration, movement with constant speed and stopping, at different parameters.

**Keywords:** Acceleration by car, movement with constant speed, stopping

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## STUDY OF FAKTORS RELATED TO THE RISK OF ACCIDENTS WITH PEDESTRIANS

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**Abstract:** The report presents data on serious road accidents, as well as those killed and injured in them. The relationship between these components has been sought. An analysis of the collected information based on the last ten years has been made. A broader comparison has been made of road injuries in pedestrians, covering a ten-year period for the whole country and in particular for the Ruse region. The total percentage of those killed in road accidents with pedestrians in Ruse to the country has been determined. The total number of injured in the country and in the city of Ruse in traffic accidents with pedestrians is compared. Speed has been found to be a determining factor in assessing the severity of possible injuries from a collision of a vehicle with a vulnerable road user. The information gathered supports the claim that many people still lose their lives in road accidents. For this reason, it is imperative to take measures to reduce mortality and injuries.

**Keywords:** Serious road accidents, Fatalities, Road injuries, Total percentage.

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## ASSESSMENT OF THE IMPACT OF ROADS AND VEHICLES ON THE NUMBER OF PERSONS KILLED IN ROAD TRAFFIC ACCIDENTS IN BULGARIA

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**Abstract:** Bulgaria ranks one of the last places in the EU in terms of "the number of deaths in road accidents (accidents) equated to 100 thousand inhabitants", but in some areas of the country this indicator is many times higher than in the country. Despite the fact that the main reason for this is the violations of drivers, the exact mechanism of occurrence of an accident according to [1] requires a comprehensive analysis of all components, including environment (road, weather conditions, traffic), vehicle, driver behavior, etc.

In the process, after a preliminary analysis of a database for road accidents in the different districts of Bulgaria [6], were established correlations between the "estimated number of deaths per 100 thousand inhabitants" in each district and the following:

- the length and condition of the road network of 2nd and 3rd class and the number of days without snowfall;
- the number of vehicles in the district, the population and the length of the road network.

**Key words:** traffic safety, traffic accidents, roads, vehicles.

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SAT-ONLINE-1-SITST-11

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## INVESTIGATION OF THE UNEVENNESS OF THE TRANSPORT FLOWS AT JUNCTION

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**Abstract:** Modern (increasing) motorization has led to a sharp increase in the load on the street network of cities and inconsistencies in their planned decisions related to the amount of transport and pedestrian traffic, increasing the number of road accidents, noise and environmental pollution. At the same time, the movement of public transport is hampered, especially during peak hours, which is the reason for increasing the travel time of passengers. When planning its schedule, it is necessary to predict the irregularity in time of transport flows, which has its own characteristics depending on the nature of the settlement. The paper assesses the time irregularity of the traffic flows at a junction in the city of Ruse. The data were taken from video surveillance cameras positioned at major intersections.

**Keywords:** transport flows, unevenness, traffic, intersection

**JEL Codes:** L10, L11

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SAT-ONLINE-1-SITST-12

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**EXPERIMENTAL STUDY OF THE VEHICLE ACCELERATION WITH AN  
AUTOMATIC TRANSMISSION**

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**Abstract:** This article presents the results of experimental studies of the acceleration of a vehicle with a stepless automatic transmission. A vehicle of category M1 and a VBox Data Logger registration system were used. The experimental studies were conducted at different rates of starting and movement - normal, fast and very fast. The Statistical Package for the Social Sciences and the Matrix Laboratory were used for statistical processing of the results. The main numerical characteristics and the confidence interval are determined. A suitable empirical model was chosen, which approximates the acceleration depending on the distance traveled.

**Keywords:** Acceleration, Vehicle, Automatic Transmission.

**JEL Codes:** L91

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## STUDY OF TRANSPORT PROCESSES USING A SIMULATOR

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**Abstract:** *About 1.3 million people die each year worldwide. Man, and another 20-50 million. people suffer from injuries as a result of an accident. More than 60% of deaths are between 15 and 44 years old. It has been proven that young drivers make the most mistakes when driving on the road, and the reason is most often stated in their training during their preparation for drivers in schools. In the country at the moment safety training begins with kindergarten education, followed by school education, as well as self-education and non-formal education by relatives and acquaintances. A simulator study found that during the day, drivers drive at higher speeds, take incorrect overtaking, which in turn leads to leaving the lane and errors in overtaking and stopping. Drivers were found to be more concentrated at night and did not allow themselves to drive at an inappropriate speed, which reduced the number of overtaking and stopping errors. Due to the reduced visibility in the evening there is a higher number of people leaving the lane and taking the car away..*

**Keywords:** *Accident, Young drivers, Education, Simulator, Higher speed, Overtaking*

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SAT-ONLINE-1-SITST-14

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IMPACT OF VEHICLES ON TRAFFIC SAFETY

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**Abstract:** For the last decade, data on serious road accidents with fatalities and injuries have varied values and, although decreasing, remain high. Their reduction does not proceed with the dynamics planned at national and European level, although a large number of road accidents are preventable. The reduction of casualties and losses is a function of the regulatory framework, road infrastructure, car fleet, behavioral patterns of road users, control activities, adequate rescue and emergency medical care. The study assesses the main characteristics of the car fleet and its impact on the state of traffic safety.

**Keywords:** safety of motor vehicles, traffic accident.

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**SAT-ONLINE-2-SITST**

**SAT-ONLINE-2-SITST-01**

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**STUDY OF DYNAMIC CHARACTERISTICS OF CARS USING  
DIFFERENT ENERGY SOURCES**

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**Abstract:** A study was made of cars powered by gasoline, electricity and hydrogen, respectively. The experiments were performed on a track with established parameters. Objects with similar technical characteristics are selected. The energy consumption under the same meteorological and road conditions is estimated. Energy efficiency, dynamic characteristics and environmental impact were assessed. The results will be used to build models of car operation using different energy sources.

**Keywords:** Gasoline, Electricity, Hydrogen, Established parameters, Models, Different energy sources.

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## METHODOLOGY FOR DRY PORT EFFICIENCY ASSESSMENT IN CASE OF UNBALANCED IMPORT AND EXPORT CONTAINER FLOW

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**Abstract:** *In idealized conditions, the dry port efficiency depends mainly on the distance to the sea container terminal and the inland stuffing and stripping locations serviced through the dry port.*

*In real conditions, there are various factors negatively affecting the efficient use of the dry port, such as weekly, monthly and seasonal fluctuations in the intensity of the container cargo flow or imbalance in the import and export container flow.*

*The present study proposes a methodology for assessing specifically the impact of the unbalanced container flow on the dry port efficiency.*

**Keywords:** *dry port, inland container terminal, unbalanced container flow.*

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## PROCESS-ORIENTED DESIGN OF AN INTERMODAL TERMINAL

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**Abstract:** *The number of intermodal consignments and the route of the cargo flows are the basis of intermodal logistics chains. They are significant for selection the location of the intermodal terminals, as well as for the economic efficiency of the intermodal transport. The present study is aimed at describing the processes and stages in the organizing of logistics chains and their influence on the selection of a technology of operating of an intermodal terminal. The cargo flows through main points of transport infrastructure of Bulgaria, which generate cargoes towards the intermodal terminals, have been studied. The possibilities for a process-oriented technical-technological design of an intermodal terminal have been analyzed. The different phasses of the project – from the feasibility study to the physical implementation of the project have been presented in the study.*

**Keywords:** *intermodal transport, intermodal terminal, process-oriented design.*

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SAT-ONLINE-2-SITST-04

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## ENVIRONMENTAL AND SOCIAL ASPECTS IN THE FORMATION OF URBAN PASSENGER SYSTEMS TRANSPORT

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**Abstract:** *The paper focuses on environmental and social aspects in the formation of urban passenger transport systems. These are the main aspects that must be taken into account when determining the basic parameters of a transport scheme. Public transport is not an end in itself. Its purpose is not to profit from the passenger transport business itself. The benefits far outweigh the revenue from the sale of transport documents. Urban passenger transport is a way to solve environmental, social, and urban problems. The effect extends to the whole community living in one town.*

**Keywords:** *city logistics; technological innovations; environmental sustainability; social sustainability; urban transport; urban passenger systems*

**JEL Codes:** *R40, R42*

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## ANALYSIS OF THE TRANSPORT WORK IN A COMPANY FOR PUBLIC TRANSPORT OF PASSENGERS

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**Abstract:** Travel from one place to another is one of the most important needs of people, whose satisfaction is the main task of passenger transport. Passenger transport is of great economic and cultural importance. In recent years, there has been a trend of increasing the number of vehicles and an increase in individual transport in cities, which is a reason for a significant reduction in speed, increased noise and pollution, parking problems. This also leads to problems with the organization of urban passenger transport, non-compliance with schedules, violation of regular traffic, deteriorating quality of transport services.

**Keywords:** public transport, travel time, transport service

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## STUDY OF THE OPPORTUNITIES AND CHALLENGES FOR DECARBONIZATION OF TRANSPORT FOR URBAN LOGISTICS

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**Abstract:** Currently, urban logistics is responsible for a significant share of carbon emissions, air pollutants, urban noise, congestion and safety risks. At the same time, urban logistics activities are growing due to the increase in the population of cities and their incomes, as well as with the growth of e-commerce, which leads to countless additional deliveries, both to private addresses and to companies and organizations. Modern development of technologies, business models and policies can be used effectively to decarbonise transport in urban logistics. In the present study, through observations and information gathering, the opportunities and challenges for the city of Ruse related to solutions to reduce the carbon footprint of transport in urban logistics are assessed. A proposal has been made to develop a plan for sustainable urban logistics SULPs.

**Keywords:** city logistics, transport, sustainable, decarbonization

**JEL Codes:**

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SAT-ONLINE-2-SITST-07

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## RESEARCH OF SOME SECTIONS OF BICYCLE INFRASTRUCTURE IN THE CITY OF RUSE

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**Abstract:** *The report presents a study covering several sections of cycling infrastructure in the city of Ruse. The studied sections are part of the bicycle network and cover a route starting from Druzha 3 to the University of Ruse. The aim of the study was to determine the accessibility and continuity of bike lanes along the route. These main factors set in the design of the bicycle network have a significant impact on the choice of this mode of transport by the population of the city. A well-built bicycle network is perceived by a wider part of the population. In the context of the COVID-19 pandemic, bicycle transport has become even more popular in many cities around the world.*

**Keywords:** *bicycle infrastructure, bicycle network, bicycle transport.*

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SAT-ONLINE-2-SITST-08

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**RESEARCHING THE PREPARETNESS OF THE ROAD TRANSPORT  
COMPANIES FOR USUGE OF ETIR CARNET AND ECMR**

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**Abstract:** *The road transport of goods takes a large share of the domestic and the international transportation of the country. In the current research we review the international practice for the usage of e-CMR and e-TIR CARNET and we evaluate the awareness, and the preparedness of the road transport companies in Bulgaria for the usage of those documents. The survey conducted among the companies reveals that the two digital documents are not known by the specialists of the companies, as well as their advantages and prospects for their obligatory introduction in the transport practice. The study propose additional training for transport speacialists, who will be able to perform the new tasks related to digitalization, including familiarization with the principals of operation of the platforms. This will contribute for faster and more competent integration of digital technologies in the daily work of companies, their strengthening and good positions in a competitive environment.*

**Keywords:** *road transport, inovation, e-CMR and e-TIR Carnet, digitalization .*

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SAT-ONLINE-2-SITST-09

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## USE OF THE ROLE-PLAY METHOD FOR TRAINING STUDENTS FROM TRANSPORT SPECIALTIES

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**Abstract:** When teaching students, they need to master both theory and gain practical experience. This is not always possible through the application of training practices and internships, which requires the inclusion of practical tasks in the training material. According to a number of studies, the application of role-playing games in education has a positive effect on the learning material. For this reason, for discipline from the curriculum of students, a role play game has been developed allowing students to present themselves in one of the positions in the car service, responsible for the distribution of labor in the service. The purpose of this role play is for students to understand the process of distribution of work in the service, to gain practical knowledge and to learn what are the characteristics and limitations of this process.

**Keywords:** teaching, learning, role-playing games, simulation games, work management, educational games

**JEL Codes:** L10, L11

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## SURVEY OF CONSUMER OPINION ON THE SERVICES PROVIDED BY COURIER COMPANIES IN THE CITIES

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**Abstract:** *The report is a socially informative survey of courier service's users in major cities of Bulgaria. For this, a questionnaire was prepared, which was filled in by 53 respondents. The survey results show that with an increase in customer's orders due to changes in social behaviour and people's lives over the past two years and an increase in the number of people in cities, it is necessary to increase the quantity and quality of service. This is due to the need to open new offices near the place of residence of clients and the ability to use the service 24 hours a day. The survey results allow courier companies to improve the level of their services. Data processing was carried out by using the SPSS software product.*

**Keywords:** *Courier office, courier service, courier.*

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## OVERVIEW OF TRENDS IN URBAN MOBILITY DEVELOPMENT

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**Abstract:** Congestion, air pollution, CO<sub>2</sub>, safety and noise pollution are common problems in cities. In addition to the direct impact on traffic, transport also has an impact on social development, social exclusion and accessibility for people with reduced mobility. Many of these problems are expected to increase in the future as cities continue to grow and face additional demographic changes, such as an aging population. The need for sustainable transport is increasingly recognized and given due consideration. This study on the basis of a research reviews the trends in urban mobility and makes a comparative analysis of good international practices in the field of urban mobility together with the development of urban mobility in Bulgaria.

**Keywords:** urban mobility development, trends, traffic

**JEL Codes:** L10, L11

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**COMPARATIVE ANALYSIS OF CURRICULUM TRAINING CURRICULA  
FOR CATEGORY "B" DRIVERS IN EUROPEAN UNION COUNTRIES**

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**Abstract:** *In the training of candidates for drivers of category "B" in different Member States of the European Union, different schemes are applied, the main goal is related to quality training of the people in traffic safety. In this regard, a profile of the candidate driver has been prepared for each trainee, which reflects his / her training progress. The curriculum and its content have a serious impact on the training. Due to the serious differences reported in the preparation of candidates for drivers in different EU countries, assessed by the number of accidents with new drivers, this report analyzes the curriculum for training candidates for category "B" drivers in the Republic of Bulgaria and the countries from the European Union. The programs for obtaining a European driver's license in category "B" are additionally evaluated.*

*The comparative analysis was made on several indicators: theoretical training, practical training, duration of training, completion of training, age of trainees, presence in the curriculum of the GDE matrix.*

**Keywords:** *Candidate Guide, Category B, GDE matrix, Category B curriculum*

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## ANALYSIS OF INNOVATIVE HYBRID SYSTEMS IN RIVER NAVIGATION

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**Abstract:** In recent years, electric hybrid drives for vessels have become increasingly common due to high stability, efficiency and lack of noise and vibration when driving, simplified system control and management, low maintenance costs compared to internal combustion engines and most - already striving to achieve zero harmful emissions.

This report analyzes the application of a system solution for propulsion of light vessels through the use of highly efficient electric motors, photovoltaic panels, hybrid inverters, batteries and fuel cells with hydrogen tanks. Particular attention is paid to the addition of a system for monitoring and control of the individual drive elements, a navigation system consisting of a GPS / AIS transmitter, an on-board communication system that can transmit and store data in real time. The purpose of the stored databases is to create a universal application using a mathematical model to design future self-sufficient energy drives for different vessels depending on the weight, hydrodynamic resistance of the hull, speed and duration of navigation.

**Keywords:** vessel, hybrid propulsion system, hydrogen fuel cells, decarbonization

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## **SOME MANAGEMENT ASPECTS OF THE IMPLEMENTATION OF THE INTERNET OF THINGS**

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**Abstract:** The report is dedicated to the managerial and economic benefits of the introduction of the modern technology Internet of Things. By conducting a literature review, its basic concepts are considered, its advantages defined, and the stages of implementation are indicated. The purpose of the study is to highlight the main management aspects in making a decision to implement the Internet of Things. The results aim to reduce production costs and optimise staff, increase productivity, improve quality, and speed up and improve the decision-making process. The successful implementation of the Internet of Things includes building connectivity of operations, introduction of remote operations, preventive analysis and support.

**Keywords:** Internet of Things, Management, Innovation, Implementation process.

**JEL Codes:** L63, M15, O32

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## COMPARISON OF METHODS FOR ATTENDANCE TRACKING FOR OFFLINE AND ONLINE EVENTS IN EDUCATIONAL ORGANIZATIONS

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**Abstract:** The paper compares the common approaches to track and store information on attendance for different type of events (online, offline, mixed). The parameters used in the comparison include relative complexity, cost, usage of the system for online and offline events. The parameters are chosen by the author, but they take into account other parameters on assessing similar systems by other authors. Educational organizations may need to cover different types of events (i.e. for online lessons, in-room lessons, councils, organizational events etc.). Each type of event requires different set of features, included in the tracking system. Keeping one feature often provoke inability to provide other features (i.e. providing both authorized and anonymous entries, both online and offline modes, both registered and unplanned visitors). In order to cover different case one organization may apply several attendance tracking systems. This paper treats such practice neither good or bad, but provides a scale system to choose the efficient approaches for attendance tracking based on the requirements of each event type.

**Keywords:** Attendance tracking system, Educational organizations, e-learning

**JEL Codes:** I20, D73, M15

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## CASE STUDY: MANAGING THE MONITORING SYSTEM FOR ATTENDANCE TRACKING USING SURVEY ADMINISTRATION SOFTWARE

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**Abstract:** The paper purposes a variation of attendance tracking system based on an online survey administration software (Google Forms and Google Spreadsheets). It includes guide for recreating such system. The system aims to cover the process of attendance tracking in chosen disciplines in University of Ruse “Angel Kanchev” and thus it is affected by particular decisions regarding the specific environment and processes in the organization. The main target for the system was to improve the speed of the traditional (in the organization) attendance monitor system (in particular signing the names and student ids to a paper sheet) without significant trade-offs. The main disadvantages (comparing to the traditional approach) are requirements of internet-access for the guests at sign-in phase and internet-access for the moderator at checking phase. The system covers specific needs: both online and in-room lessons; anonymous and non-registered users access; ability to export the data to the main journal of the discipline; fast and easy usage for the visitors. Other advantages and limitations comparing other traditional and modern alternatives are discussed.

**Keywords:** Attendance tracking system, Educational organizations, e-learning

**JEL Codes:** I20, D73, M15

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## PRODUCTION PLANNING AS KEY ELEMENT FOR THE OPERATIONAL EFFECTIVENESS OF INDUSTRIAL ENTERPRISES

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**Abstract:** *This article presents the main concepts of the production planning and reviews the organizational benefits which industrial entities could achieve by its proper utilization. As nowadays companies from various industries worldwide are striving to constantly improve their processes, profits and market share, gain competitive advantages, achieve sustainable business practices while at the same time coping with growing challenges and costs, it is critical for them to have an efficient and proven production planning process that can improve their operational effectiveness. The current article overviews the main planning aspects – production and operational planning (scheduling) and control, as well as the operational effectiveness of industrial enterprises. Several production planning limitations and future research recommendation are presented too.*

**Keywords:** *production planning / operational planning (work schedule) / operational effectiveness / models / concepts*

**JEL Codes:** *L10, L11*

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## THE MODEL OF MATURITY AS A FACTOR FOR SUSTAINABLE DEVELOPMENT OF ORGANIZATIONS

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**Abstract:** The main goal of each organization is to achieve sustainable development in the recent complex and constantly changing environment and the management team has to meet the needs and expectations of all stakeholders. This paper reviews maturity models, aiming of presenting the essence of self-assessment using a maturity model of quality, environmental and health and safety management systems as a factor for achieving sustainable development of organizations. As a future study, a methodology for determining the level of maturity through a model of maturity of environmental management systems according to ISO 14001:2015 and health and safety at work according to ISO 45001:2018 will be developed.

**Keywords:** Integrated systems for quality management, environment and health; Maturity model

**JEL Codes:** L10, L15

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## KPI MANAGEMENT AS KEY ELEMENT FOR THE OPERATIONAL EFFECTIVENESS OF AUTOMOTIVE INDUSTRY

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**Abstract:** As the volume of data in companies increases, it becomes impossible to collect important and comprehensive information by traditional means. This paper presents how business software solutions can help in data analysis, after collecting the required amount of data and providing tools with appropriate technologies to support the collection, integration, storage, editing and analysis of existing and real-time data arrivals. While almost only the big companies were interested in this topic a few years ago, in the meantime it became necessary for all companies which want to make important decisions in time for optimization, prevention and prediction of uncertainty in production. This article focuses on the general possibilities of using KPI management in manufacturing enterprises, which business intelligence system, techniques and methods can be used and what is their role in the company. Finally, the success factors /KPIs/, which are key element for the operational effectiveness in automotive industry will be taken into account.

**Keywords:** business intelligence system; decision-making; kpi management; business analytics

**JEL Codes:** L10, L11

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## INTRAPRENEURSHIP IMPROVEMENT IN A MACHINE BUILDING FIRM THROUGH THE ISO 9001:2015 PRINCIPLES

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**Abstract:** *There are different principles in ISO 9001: 2015, such as: leadership; people involvement; process approach; improvement and others. The purpose of this report is to study how some of these principles could improve the internal entrepreneurship in a machine-building enterprise.*

**Keywords:** *intrapreneurship, industry, ISO 9001:2015*

**JEL Codes:** *L0, M11*

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## DEVELOPMENT OF SYSTEM WITH QUANTITATIVE INDICATORS FOR MONITORING INTERNAL ENTREPRENEURSHIP

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**Abstract:** The document represents the development of a methodology and its elements for the promotion of internal entrepreneurship in a machine-building enterprise. In order for this methodology to be measurable and adequate, a system of indicators has been developed to determine its adequacy on the quality management system in a machine-building enterprise. The methodology is in accordance with the requirements and specifics of the enterprise. It is individual. This document also addresses the topic of difficulties and peculiarities that the trainer who applies this methodology may face and what stages of preparation he must go through in order to be met with respect and esteem by the machine-building enterprise. The principle of the individual approach and development of the internal entrepreneurs is set. Principle of personal growth and professional attitude towards a machine-building enterprise and its employees is discussed.

**Keywords:** Internal Entrepreneurship, Quantitative Indicators.

**JEL codes:** L21, L26.

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## SOCIAL MEDIA INFLUENCERS AS DIGITAL ENTREPRENEURS

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**Abstract:** *The focus of the article is on the process of developing the business of a social media influencer as a digital entrepreneur. At first the fields of the digital entrepreneurship are briefly revealed in order to introduce social media influencers as such type of entrepreneurs. The article shows the role and classification of the social media influencers, the specifics of SMI's business model including the ways of creating value and generating incomes as well as the positive and negative sides of practicing this kind of business from the point of view of influencers themselves.*

**Keywords:** *social media influencers, digital entrepreneurship, SMI's business model*

**JEL Codes:** *L26, M31, M37*

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## IMPROVING THE ORGANIZATION AND SAFETY OF WORK IN INDUSTRIAL ENTERPRISES IN A PANDEMIC CONDITION

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**Abstract:** The unexpected and at the same time intensive changes in the way of life and work from the beginning of 2020 until now have imposed the need for equally fast, but adequate changes in the way business organizations implement, develop and control their main and secondary processes. Along with the previously known technological, organizational, social and managerial aspects of the activity of the enterprises, another one was added, namely - preservation and even increase of the safety of the employees in the conditions of a pandemic. This requires adaptation of the approaches of organization and management of production in a changing environment. For this reason, this report presents a proposal for a tool for assessing the need to improve the organization and safety of work in production enterprises in a pandemic, even in cases where the business units are micro and small enterprises. The approach was tested by a real field study in August 2021 in a small manufacturing enterprise in the food industry and the results allow the definition of both specific recommendations to the pilot object of study and guidelines for its potential application in other industrial enterprises.

**Keywords:** enterprise management, organization of production

**JEL Codes:** O310, M100

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**RESEARCH OF CONSUMER RESISTANCE IN PERCEPTION OF A NEW PRODUCT IN THE CONDITIONS OF COVID PANDEMIC**

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**Abstract:** *The outbreak of the COVID 19 pandemic in the last year and a half is the main reason for the occurrence of a serious economic crisis, both in Bulgaria and worldwide. A number of economic sectors have been drastically affected and continue to suffer negative consequences. One of the most affected areas is retail: many outlets have been forced to close for long periods of time, and those that have continued to operate in a state of emergency have been severely hampered by the strict measures imposed by in order to prevent the spread of the infection. On the other hand, consumer behavior has also changed significantly - demand for food and basic necessities has increased significantly in order to replenish. It turned out that in such conditions of isolation it is necessary to look for alternatives for shopping related to online shopping and home delivery. In the present study, an in-depth study of consumer resistance to the perception of a new product (online shopping from hypermarkets, supermarkets and neighborhood stores with home delivery included) in the context of the COVID crisis will be conducted.*

**Keywords:** consumer resistance, new product, retail, COVID-crisis

**JEL Codes:** M10, M31

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## STUDY ON THE IMPACT OF ORGANISATIONAL CHANGES CAUSED BY THE COVID PANDEMIC

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**Abstract:** The Coronavirus pandemic has had a global impact on the functioning and future survival of many organizations around the world. The pandemic posed challenges to the normal functioning of organizations which is linked to a complete change in lifestyle caused by the so-called new normal. Changes are an integral part of the organization's activities, but in the current pandemic situation their manifestation is even more dynamic and provokes many reactions, both individually and at the organizational level. These changes reflect on certain areas in the organizations' activities. This is what requires their research, analysis and management with a view to their future survival. This report presents the results of a study on the impact of the change caused by the COVID pandemic on two organizations operating in the service and manufacturing areas.

**Keywords:** change, covid pandemic, resistance, approaches to overcoming

**JEL Codes:** M1, M12

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## CO-MANAGEMENT - AN ALTERNATIVE APPROACH TO DECISION MAKING

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**Abstract:** The modern economic environment is characterized by exceptional dynamics, predetermined by the rapid pace of technological development, emergence and spread of serious viral diseases worldwide and the need for full and reasonable use of limited natural resources. As a result, many problems arise, the solution of which requires the pooling of knowledge and experience of many consumer groups and government institutions. There is a huge variety of successful management systems and institutional opinions to solve the same types of problems. As such an alternative management approach, Co-management is based on the idea that governance is not a fixed state, but an ongoing problem-solving process that involves sharing responsibilities between government and local users of resources. In this regard, the main purpose of this article is related to the study of the nature, specifics and opportunities provided by the tools of joint management to achieve organizational development in terms of serving certain social groups in society.

**Keywords:** Co-management, knowledge, governance, social groups

**JEL Codes:** D91, M12

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## REINFORCE SKILLS OF STUDENTS AND TEACHERS TO ENHANCE OF HIGHER EDUCATION IN MOLDOVA

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**Abstract:** A priority for EU countries is the need for improving entrepreneurial and digital skills in higher education in the less developed areas. This is the main objective of international project „ReSTART” - „Reinforce entrepreneurial and digital skills of students and teachers to enhance the modernization of higher education in MOLDOVA”. The project is financed through the program ERASMUS+ Programme 2014 - 2020, Key Action2 (KA2): Cooperation for innovation and the exchange of good practices. The paper presents the main characteristics of the project „ReSTART” and the best practices which were transfer for European to Moldavian partners.

**Keywords:** higher education, entrepreneurial skills, digital skills

**JEL Codes:** M10, O10, O15

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## CHALLENGES TO HUMAN RESOURCES IN SERVICE MANAGEMENT

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**Abstract:** The purpose of this paper is to highlight some misunderstandings on human relationship management concerning services. How we can manage the front- and/or back office people? Are they involved in the service process? How to provoke them? It is underlined that there are challenges, which are outstanding to penetration of customer in service process in terms of human resources. In the terms of theory, it is normal to use and study the relationship between the degree of customer contact and service approaches (individuals and flow line). Evaluation scheme has been adapted to check various customer service tools.

**Keywords:** Service Management, Human Resources.

**JEL codes:** L21, L29, M20, O15.

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## CYCLE OF SUCCESS OR CYCLE OF FAILURE: WHICH ONE IS APPROPRIATE FOR SERVICE ORGANIZATIONS

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**Abstract:** *The purpose of this paper is to highlight issues of human relationship management at present-day service companies. Is it certain that cycles models are still working? How can be applied to the profit chain? The models of failure and success at service organizations are discussed. The main conclusion is that cycle approach to services should be a pragmatic topic in terms of human relationship management.*

**Keywords:** *Services, Human Relationship Management.*

**JEL codes:** *L21, L29, M20, O15.*

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## **FRI-ONLINE-1-EM2**

### **FRI-ONLINE-1-EM2-01**

## **SAVING AND CONSUMPTION SPENDING IN BULGARIA DURING THE COVID19 PANDEMIC**

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**Abstract:** *The COVID19 pandemic have had the impact on all sectors of economy and life. The government has imposed restriction in the movement of people and economic activities to protect public health and reduce negative effects of pandemic. The introduced restriction measures changed personal behavior. The peoples reduce desire to go shopping, to the restaurants or theaters and increase desire to save for an uncertain future time.*

*The recovery of consumer spending was observed after first lockdown in March in Bulgaria. I third and fourth quarter 2020 they increased. After second period with massive cases of COVID19 in the country, the consumption fallen and recovery during the second quarter of 2021. The main part of consumer spending is for the food (between 35% - 40 %). Spending for health care raised immediately after first lockdown, in opposite - the consumption spending for holiday and culture are with negative rate. The shopping and payment behavior changed – from cash to online trade and payments.*

*Forced saving – declined consumption spending during the lockdown started sharply increase in households saving. The bank deposits are main assets for Bulgarian households. The main factor for this change is uncertainly in the economy. The distribution of income significantly became on the base of future expectations. The bank deposits of households declined after the begging of first lockdown in March and after it raised to the end of 2020. In the end of second quarter 2021 they are with 20% more compared with same quarter of 2020.*

**Keywords:** saving, consumption, COVID 19

**JEL Codes:** E20, G51, I 15

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## WHO GETS A COVID-19 VACCINE – A CROSS SECTIONAL STUDY

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**Abstract:** We use data from the European Values Study 2017 and from Eurobarometer to examine the attitudes and values that explain the differences in vaccination rates among select European countries. We run a number of single variable regressions and multiple regressions to determine the relationship between vaccination rates and trust in government, interpersonal trust and confidence in the healthcare system. The latter appears to be the most important predictor in our models.

**Keywords:** vaccination rates, trust in government, interpersonal trust, economics to social values

**JEL Codes:** A13, I12, I18

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FRI-ONLINE-1-EM2-03

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## THE EFFECTS OF COVID-19 ON THE BULGARIAN LABOUR MARKET

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**Abstract:** The paper examines the effects of COVID-19 on the Bulgarian labour market. While the negative consequences on employment as a whole are obvious, some groups have been more affected by others. We survey the heterogenous impact of the pandemic among sex, age groups, education, type of employment and place of residence and economic activity.

**Keywords:** labour market, unemployment, employment, COVID-19, Bulgaria

**JEL Codes:** J01, J19, J63. I10, I18

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## THE IMPACT OF COVID-19 ON HOUSEHOLD INCOME IN BULGARIA

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**Abstract:** *The paper examines the impact of COVID-19 on household income in Bulgaria. An issue of interest is whether the pandemic-induced crisis has contributed to changes in income inequality as measured by decile groups and to what extent it affected different households differently, based on a number of other dimensions – economic and professional status of the head of the household, number of employees, pensioners, and children, as well as size of the household and place of residence.*

**Keywords:** Household Income, Personal Income, Inequality, COVID-19, Bulgaria

**JEL Codes:** I10, I18 I30, D31

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**FRI-ONLINE-1-EM2-05**

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## **IMPACT OF COVID-19 ON SAFE WORK**

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**Abstract:** *The paper focuses on the way the COVID-19 pandemic has impacted the health and safety at work. In a broader sense, parallels are drawn between the ISO 45000 series of standards for occupational health and safety and the relevant UN Sustainable Development Goals. The guidelines of ISO 45005:2020 are subjected to critical analysis in respect to their application in the context of an educational organization.*

**Keywords:** *ISO standards, COVID-19, Occupational Health and Safety, UN SDGs.*

**JEL Codes:** *J28, J80, L15, K32*

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FRI-ONLINE-1-EM2-06

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## ADVANTAGES OF PAN-EUROPEAN PERSONAL PENSION PRODUCT FOR BULGARIAN CITIZENS

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**Abstract:** Personal pension insurance is a responsibility and a difficult task with high complexity for every person. In the past twenty years, Bulgaria's three-tier pension system, combining the benefits of the income-distribution and capital principle of insurance, has shown an un encouraging result of inadequate replacement of income before retirement. The management of personal finances through alternative voluntary investment in the European personal pension product, motivated optimises the target role of long-term savings for the pension of insured persons, will legally guarantee mobility of retirement savings and flexibly – adaptively forms a financial resource for the development of a single capital market for personal pension insurance in the European Union. Complementing existing pension schemes and products with a new savings product distributed online in a timely manner will stimulate the evolving digitalisation of pension provision, which is entrusted with its simplified consumption and transparent portability between EU countries.

**Keywords:** European personal pension product, digitization, personal finance, pension, long-term saving, life insurance

**JEL Codes:** J32, G22, G23, G52

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European Parliament resolution of 4 April 2019 on the tax treatment of pension products, including pan-European personal pension products (2018/2002(INI)) (2021/C 116/03) <https://eur-lex.europa.eu/legal-content/BG/TXT/PDF/?uri=OJ:C:2021:116:FULL&from=EN/> (**Оригинално заглавие:** Резолюция на Европейския парламент от 4 април 2019 г. относно данъчното третиране на пенсионни продукти, включително на паневропейски персонален пенсионен продукт (2018/2002(INI)) (2021/C 116/03))

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FRI-ONLINE-1-EM2-07

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## EXCHANGE RATE UNCERTAINTY AND ECONOMIC GROWTH

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**Abstract:** The paper reviews the benefits of a single currency union in respect of the elimination of exchange rate uncertainty. It presents the gains from adopting the Euro for the CEE countries. It will be shown that the economic and monetary union will increase the degree of integration of capital, goods and labor markets and an equalization of nominal interest rates on equivalent assets. On one hand the elimination of exchange rate cost leads to an increase of national GDP. On the other hand the lack of exchange rate uncertainty triggers expansion of trade and subsequent gains from this process.

**Keywords:** Exchange rate, Economic growth, EMU

**JEL Codes:** F15, F31, F36, F43,

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## ADJUSTMENT TO ADVERSE SHOCKS WITHOUT EXCHANGE RATE CHANGES

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**Abstract:** This paper investigates the possibilities the economies to adjust to adverse shocks in the absence of exchange rate changes. It is discussed how labour market flexibility through lower labour costs contributes to a decrease in the relative price level of domestic to foreign goods. Moreover labour mobility can alleviate the effects of a region or country specific shock. The second way of adjustment in the absence of exchange rate instrument is through external financing. Having already liberalized the capital account transactions, by adopting the Euro the EMU countries remove some of the limitations on the acquisition of foreign financial assets and liabilities.

**Keywords:** Exchange rate, Labour flexibility, Budgetary Policy, EMU

**JEL Codes:** F15, F31, F36, F45

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## DEBT FINANCING OF MUNICIPAL INVESTMENTS IN BULGARIA

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**Abstract:** The report addresses the issue of municipal debt financing. Debt can be in the form of a bank or bond loan. The lack of sufficient own revenues in the municipal budgets in Bulgaria forces the municipalities to use loans. There are different determinants in terms of intensity, which act as limiters on the level of debt financing of local authorities in Bulgaria. One of the most serious problems that stand out in debt financing is that the municipalities in Bulgaria are experiencing a lack of sources of capital financing for municipal infrastructure, as the possibilities of the state budget are sharply reduced, which gives rise to deteriorating indicators in connection with unfinished infrastructure projects, buildings, municipal enterprises. On the other hand, the financial and economic consequences of the spread of the coronavirus pandemic have a significant impact on the reduction of own revenues and increase in debt financing.

**Key words:** debt, debt financing, loan, investments, pandemic

**JEL Codes:** G11, H54, R53

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## STRUCTURE OF MATERIAL CONSUMPTION – COMPARATIVE STUDY

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**Abstract:** *The paper examines the observed differences in the structure of material consumption among nine Member States of the European Union. The material mix in the countries under review is analysed and the importance of the types of materials in their economies is revealed. The study examines current trends in material use and main factors for change in consumption patterns. The study identifies current trends in the use of materials and the main factors for changing consumption patterns. To account a nation's consumption indicator Domestic Material Consumption is used. Primary raw materials are grouped into four main material categories: biomass, metal ores, non-metallic minerals and fossil energy materials. Differences in material consumption across countries are revealed.*

**Keywords:** *Material consumption, Domestic material consumption, material categories,*

**JEL Codes:** *Q50, Q56, Q57*

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## DIFFUSION OF GREEN INNOVATION

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**Abstract:** Sustainable development and competitiveness depend on the successful solution of problems with economic, environmental and social orientation. The active search for innovative solutions, their diffusion and the implementation of green, sustainable innovations in improving productivity, saving resources, protecting the environment, waste management, sustainable transport, energy efficiency, implies the participation of all stakeholders who support innovation. and diffusion process. The creation and implementation of policies and regulations at national and supranational level ensure the transition to a sustainable, green economy.

**Keywords:** Innovation, Green Innovation, Diffusion of Green Innovations

**JEL Codes:** O33, Q56, Q58

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## SUSTAINABILITY THROUGH GREEN MARKETING

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**Abstract:** Economic, environmental and social sustainability are the focus of global efforts and policies and the engine of modern development. This challenges companies to integrate sustainable development marketing activities into their business strategies. The application of green marketing by companies encourages organic production and supply of green products and provokes sustainable consumption through their successful market introduction.

**Keywords:** Enviromental Marketing, Green Marketing, Sustainable Marketing, Sustainable Development

**JEL Codes:** M31, M14

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## SCALE OF THE BULGARIAN MARKETS FOR BEEKEEPING PRODUCTS

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**Abstract:** The official agrostistics does not give an accurate account of the state and dynamics of the production markets in Bulgarian beekeeping. The aim is to determine the size of the national and regional markets (the Ruse region is given as an example) for bee products with their gray sector. The urgency of the problem related to the scale of the national and regional markets for bee products with their gray sector, provides opportunities for its transparency and acceleration of the development of Bulgarian beekeeping and improving market access. The size of the national B2B markets for bee products amounts to BGN 61.3 million / year, and of the B2C markets to BGN 53.1 million / year, i.e. a total of BGN 114.4 million / year. The gray sector of the national B2B markets for bee products amounts to BGN 20.2 million / year, and of B2C to BGN 17.5 million / year, or a total of BGN 37.7 million / year, which makes 152.1 million BGN / year. at national level. The size of the regional (Ruse region) B2B markets for bee products amounts to BGN 5 million / year, and of B2C amounts to BGN 4.4 million / year, i.e. a total of BGN 9.4 million / year. The gray sector of the regional B2B markets for bee products is BGN 1.7 million / year, and the one of the B2C markets is BGN 1.4 million / year, or a total of BGN 3.1 million / year, i.e. BGN 12.5 million / year total for the Ruse region. The analysis of the contribution of the national and regional beekeeping in the agricultural sector, as well as of their relative shares in it, reveals a lower market and public appreciation of their pollination, as well as higher real and potential market values, including those in the gray sector, compared to the deterministic ones.

**Keywords:** domestic markets, regional markets, gray sector, organic sector, Ruse region.

**JEL Codes:** M31, Q13

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## MANAGEMENT SYSTEM TRANSFORMATION WHILE MOVING TO DIGITAL ECONOMY

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**Abstract:** *The article describes the transition to digital economy, which requires a revision of the entire management system, since the existing tools are outdated and do not fit the emerging qualitatively new management paradigm, which is built on the principles of digital management and the use of personalized production instead of standardized production. Modern economy is facing fundamental changes in the ways of organizing business based on digital platforms. This trend also has an impact on the transformation of the modern management system.*

**Keywords:** *digital economy, digital transformation, industrial revolution, dynamic environment.*

**JEL Codes:** *P52, L86, M11.*

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## **CHALLENGES IN MANAGING VIRTUAL TEAMS IN SOCIAL PROJECTS**

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**Abstract:** *The development of social networks and communication technologies definitely changed the project management practice reconsidering information management of the highest importance for the quality of the project management. The software applications and the Covid -19 crisis strengthen the imposing practice of dominance of the virtual teams. The paper systemizes key features of the virtual teams in project management and analyzes their strengths and weaknesses in terms of the communication effects in managing online groups. The particular case of social projects has been used as a basis to identify the challenges in managing virtual teams. An operational definition of this specific type of project is also proposed. The e-leaders role and required features in comparison with the traditional leadership in project management are central issues discussed in the paper with the view of proposing an updated set of competencies relevant to the management of virtual teams.*

**Keywords:** *virtual teams, project management, competencies, social projects*

**JEL Codes :** *O10, O22, M14, L31*

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## CONCEPTS OF DIGITAL BUSINESS TRANSFORMATION MANAGEMENT

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**Abstract:** This paper aims to discuss key points of concepts for digital transformation management in business organizations. A methodology for studying the target concepts has been developed. The concepts of various experts regarding the strategies and models for digital transformation, validated in practice, have been investigated. A comparative analysis of the studied concepts for digital business transformation has been performed. Guidelines for future research are proposed.

**Keywords:** Digital Business Transformation, Management Concepts

**JEL Codes:** M19, O33

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**FRI-ONLINE-1-LIPC**

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**THE IMPORTANCE OF DIGITAL COMMUNICATION SKILLS IN  
ONLINE TRAINING**

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**Abstract:** *The paper examines the increasing role of digital communication skills in successful virtual training. We examine the trends in digital communication since Covid-19 lockdowns and how they influence teachers and trainers in their work. The paper includes an overview of the most popular trends in digital communication tools, their advantages and disadvantages and proposes possible changes to improve these tools. We focus on functionality of platforms and whether they help teachers, trainers and students.*

**Keywords:** *digital communication, online training, virtual training, communication skills, digital tools*

**JEL Codes:** *I20, I21*

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## VALUE PROJECTIONS AND THE “OVERTON WINDOW”

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**Abstract:** *The aim of the article is to review and briefly analyze the value projections and their variability. To determine the foundation that determines the behavioral relationship between the subjects, both between themselves and to others. These are the values that are formed in the process of inculturation. The article makes a connection between the traditional classification of values and one of the latest interpretations of value orientations and variability, the "Overton window"*

**Keywords:** *value projection, value variability, inculturation, “Overton window”.*

**JEL Codes:** *J24, O15*

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FRI-ONLINE-1-LIPC-03

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**SO CLOSE SO FAR. REFLECTIONS ON THE CULTURAL MESSAGES,  
PRODUCED IN SOCIAL MEDIA BY THE STATE INSTITUTE FOR  
CULTURE TO THE MINISTRY OF FOREIGN AFFAIRS OF REPUBLIC  
OF BULGARIA**

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**Abstract:** *The paper problematizes the hashtags usage as key phrases and cluster tools for social media audiences' generation. The focus of study is the social profile of the State Institute for Culture to the Minister of Foreign Affairs of Bulgaria. SIC supports and works for the priority implementation of national and international cultural projects and programs. The aim of the analysis is to outline messages and partnerships in Bulgarian cultural diplomacy.*

**Keywords:** *Cultural Diplomacy, Cultural Policies, Hashtags, SIC, MFA*

**JEL Codes:** *F59*

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## THE INFLUENCE OF THE SOCIAL MEDIA ON THE FORMING OF VALUE SYSTEM IN THE CONTEMPORARY YOUTH

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**Abstract:** The social media have a great influence over all aspects of life not only in adults, but also over the development of growing-up generation. Considering the fact that the internet is part of their everyday life, the important question is what are the children and young people doing in the virtual world, why are they doing this and whether and how can digital habits generate personal benefits, forming their view on the world and value system. The focus of the research is put on the contemporary young people between 14 and 19 years old. The examined platforms are Facebook, Youtube, Instagram and TikTok. For the needs of analysis, the motivation direction of the growing-ups for surfing in the web is considered, which present an opportunity to outline and categorize the predominant elements of their value system.

**Keywords:** social media, youth, values, value system

**JEL Codes:** F59

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**FRI-ONLINE-1-LIPC-05**

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## **COMPATIBILITY OF THE COUNTRY VALUE PROFILE WITH THE LEVEL OF COVID VACCINATION IN THE EUROPEAN UNION**

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**Abstract:** *The ongoing Covid-19 pandemic has been a major societal test for the coherence of the European project. The purpose of this paper is to examine the relationship between the national-cultural values and vaccination rates in some countries within the EU. First, the author points out the theoretical context of the analysis following the Hofstede’s model of cultural orientations. Then, for the purposes of the research, two most important dimensions of the model are examined (power distance index and uncertainty avoidance index) and the initial hypothesis is tested and confirmed.*

**Keywords:** *values, culture, European Union, Covid-19 vaccination rate, Hofstede’s model*

**JEL Codes:** *I19*

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## THE EFFECTS OF THE ERASMUS PROGRAMME ON THE SYSTEMS OF HIGHER EDUCATION (THE CASE WITH UNIVERSITY OF RUSE, BULGARIA)

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**Abstract:** The paper aims to study The Erasmus Programme since its beginning in general and more concretely the Erasmus Programme at "Angel Kanchev" University of Ruse. It is important to study its mission, vision and values to better understand the key actions of the programme and why it is the most powerful programme of the European Commission nowadays. The fields covered by Erasmus Programme are key areas that support citizens in their personal and professional development. High quality, inclusive education, and training, as well as informal and non-formal learning, ultimately equip young people and participants of all ages with the qualifications and skills needed for their meaningful participation in democratic society, intercultural understanding, and successful transition in the labour market. The paper provides information about the Programme in Europe and Central Asia but also some specific information about the development of the Erasmus+ Programme at "Angel Kanchev" University of Ruse, Bulgaria, in the last more than 30 years.

**Keywords:** ERASMUS, "Angel Kanchev" University of Ruse, European Region Action Scheme for the Mobility of University Students, programme countries

**JEL Codes:** I10

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**ENGLISH AND AMERICAN EVANGELISM FOR ISRAEL**

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**Abstract:** *Evangelism as a religious movement is the core of State of Israel, established in 1948. It came out from Martin Luther's Reformation, it put down roots in the state of Lord Protector Oliver Cromwell and materialized its radical philosemitic profile in the United States. Judeo-Christianity or Christian Zionism is the religious amalgam that explains the inextricable links between Anglo-Saxon evangelicals, Judaism as a religion and the Jewish state.*

**Keywords:** *Israel, USA, UK, Evangelism, Martin Luther, Judeo-Christianity*

**JEL Codes:** *F50, F52*

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## THE SUBNATIONAL LEVEL OF EU MULTI-LEVEL GOVERNANCE

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**Abstract:** *The study views EU multi-level governance (MLG) as a paradigm, which has revealed the importance of regional actors in policy making. It elaborates on research findings related to the application of the paradigm. Then it transits to a discussion on European regionalism and the concept "Europe with the regions". Further on, the regionalization in EU is being explained with a special focus on the cohesion policy and its reforms, as well as the existing formats of regional cooperation, i.e. cross-border, transnational and interregional cooperation. The conclusions refer to the neglected subnational level in Bulgaria and the demand for change in line with European regionalism.*

**Keywords:** multi-level governance, subnational level of governance, regionalism, regionalization

**JEL Codes:** F55, H19, H79

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## THE NEW AUKUS TRILATERAL PACT AS A CHALLENGE FOR THE EUROPEAN SECURITY AND GEOPOLITICS

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**Abstract:** This paper presents implications of the new AUKUS security pact between the United States, Australia and Great Britain and its impact on international relations. A special focus is put on the challenges for the European security. The analysis is based on topical official documents and political analyses as well as on international media publications.

**Keywords:** AUKUS, geopolitics, global security, European security, international relations

**JEL Codes:** Z28

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## EXPLANATORY MODEL OF SEPARATISM IN EU MEMBER STATES

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**Abstract:** The paper introduces an explanatory model of separatism by identifying factors which catalyze/suppress separatist phenomena. The model discloses the impact of 13 factors in 3 EU member states. The analysis is based on the approach of social constructivism and on the application of methods such as theoretical analysis, desk research, comparative analysis, diachronic analysis, PEST analysis, and case study analysis. In addition, the methodology is applied at the three levels of the paradigm of multilevel governance in the EU.

**Keywords:** separatism, secession, political self-identification, EU multi-level governance

**JEL Codes:** F50, F22, Z10

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## RELATIONS BETWEEN MANAGING AUTHORITY AND BENEFICIARIES WITHIN EU MULTILEVEL PROJECT GOVERNANCE. A STUDY OF PRACTICES IN BULGARIA

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**Abstract:** *The paper discusses challenges for beneficiaries within their relations with the managing authority in the framework of multilevel governance of EU co-funded programmes and projects. The analysis considers implications of project implementation with a focus on Bulgaria. The findings are drawn from primary data collected by semi-structured interviews and case-studies,*

**Key words:** *EU multi-level project governance, policy making, programming, project implementation*

**JEL Codes:** *F53, H83*

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## EUROPEAN GREEN POLICIES AND THE COMPLEXITY OF ENERGY TRANSFORMATION

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**Abstract:** *The paper is tracking reasons for the change in the European energy paradigm during times of increasing energy consumption needs, acceleration of climate change, and an increasingly competitive energy market. The paper reviews the European union's drive for an accelerated transition to a carbon-free economy and the resulting problems related to the Union itself, as well as the problems member states and businesses are facing. The findings refer to the problems of diversification of energy sources, energy consumption that meets demands of European competitiveness, and the threat of increasing energy poverty.*

**Keywords:** *Green policies, Carbon-free economy, Energy transition, Energy diversification, energy poverty*

**JEL Codes:** F53

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European Commission. 2030 Climate Target Plan [https://ec.europa.eu/clima/eu-action/european-green-deal/2030-climate-target-plan\\_bg](https://ec.europa.eu/clima/eu-action/european-green-deal/2030-climate-target-plan_bg) 06/10/2021 (**Оригинално заглавие:** Цели в областта на климата до 2030 г.)

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## AN ATTEMPT TO OPERATIONALIZATION OF THE CONCEPT RESILIENCE TO MIGRATORY PRESSURE

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**Abstract:** *This paper searches for the most appropriate indicators related to the measurement of resilience to migratory pressure. On the grounds of literature review and observation so far, the following indicators have been identified: specific border infrastructure, levels of social sensitivity to the problem, institutional competence, NGO support, efficiency and effectiveness of border control, control over fringe groups (nationalists, para-military squads, etc.), effectiveness of fight against human trafficking.*

**Keywords:** *Resilience, migratory pressure*

**JEL codes:** *F22, F50*

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## PERCEPTIONS OF GOOD GOVERNANCE OF CULTURAL POLICIES IN RUSE MUNICIPALITY

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**Abstract:** The paper explores various perceptions of Ruse municipality’s citizens about the characteristics of good governance at a municipal level. The views, attitudes and perceptions are being collected within a series of focus groups with several target publics of citizens, differentiated by age, level of involvement in cultural activities and localities—central/peripheral neighbourhoods. The collection of empirical data for these views, attitudes and perceptions regards relationships between authorities, private business and civic society. By not fixing any rigid boundaries of the concept of good governance in advance, the analysis relies on testing the most primary perceptions, so that unique local context of good governance practices could be identified.

**Keywords:** Good governance, culture, cultural policy, municipal governance level

**JEL Codes:** Z18

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**THE ENVIRONMENTAL PILLAR OF EUSDR:  
PROMISES AND ACHIEVEMENTS**

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**Abstract:** *The European Union Strategy for the Danube Region (EUSDR) is based on 4 main pillars to address common problems for a number of countries. The main purpose of this paper is to examine the latest development and trends in the following three priority areas: (1) restoration and maintenance of water quality, (2) prevention and management of environmental risks and (3) protection of biodiversity, natural landscape and air and soil quality. The conclusions provide evidences of effectiveness of Strategy implementation.*

**Keywords:** EUSDR, EU, environment, effectiveness

**JEL Codes:** F53

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Priority area 4 “Water Quality” (<https://waterquality.danube-region.eu/>)

Priority area 5 “Environmental Risks” (<https://environmentalrisks.danube-region.eu/>)

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## **TOWARDS SUSTAINABLE ENVIRONMENT: GOALS AND RESULTS OF EUSBSR**

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**Abstract:** *The concept for of the European Union Strategy for the Baltic Sea Region (EUSBSR) is the first Macro-regional Strategy of united Europe. It defines three objectives, which represent the three key challenges of the Strategy: saving the sea, connecting the region and increasing prosperity. Findings of this paper relate to results of a 12-year implementation of the strategy.*

**Keywords:** EUSBSR, EU, Environment, multi-level governance

**JEL Codes:** F53

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([https://ec.europa.eu/regional\\_policy/en/policy/cooperation/macro-regional-strategies/baltic-sea/#1](https://ec.europa.eu/regional_policy/en/policy/cooperation/macro-regional-strategies/baltic-sea/#1))

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EUSBSR, About the EUSBSR (<https://www.balticsea-region-strategy.eu/about/implementation>).

## NATIONALISM, POPULISM, NATIONALIST POPULISM: HOW TO MAKE THE DIFFERENCE

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**Abstract:** *The paper attempts to clarify and explain the difference between three frequently misused and misunderstood concepts – Nationalism, Populism and Nationalist Populism. It argues that the three phenomena have specific meanings and should be distinguished in political science research and by the general public. The demand is particularly urgent as within the last two decades – beginning with the terrorist attacks of 11 September 2001 and culminating with the European migrant crisis, following the events of the Arab Spring and the armed conflicts in the Middle East and North Africa, European political parties and movements comprise elements of nationalist, populist or national populist ideologies. Those movements have become increasingly visible vis-à-vis the political mainstream.*

**Keywords:** *Nationalism, Populism, Nationalist Populism*

**JEL codes:** *Z10*

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## **TRANSNATIONAL CIVIL SOCIETY – MEANINGS AND DEFINITIONS**

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**Abstract:** *The paper explores recent definitions and meanings associated with the concept of **transnational civil society (TCS)**. The analysis is based on data, collected from publications in the fields of political science and international relations, including theories of transnationalism. The findings provide a synthesis, which is the theoretical background of a dissertation, aiming to contribute to the positioning of **International Elias Canetti Society** as an actor of the global transnational civil society.*

**Keywords:** *Civil society, NGOs, globalization, democracy, transnationalism, transnational civil society*

**JEL Codes:** *Z19*

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**NON-GOVERNMENTAL ORGANIZATIONS IN SUPPORT OF  
EUROPEAN UNION STRATEGY FOR THE DANUBE REGION.  
THE CASE OF EUROPEAN INITIATIVES WITHOUT BORDERS.**

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***Abstract:** The paper reviews the European Union Strategy for the Danube Region and discloses the added value of non-governmental organizations within its implementation. The data collection is based on desk research, literature review, the official website of the Strategy and the archives of the Bulgarian NGO European Initiatives without Borders. It is argued, that the concrete NGO under exploration could be characterised as one of the drivers of the emerging Danube region civil society.*

***Keywords:** European Union Strategy for the Danube Region, civil society*

***JEL Codes:** F53*

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## **EU COHESION POLICY: THE TERRITORIAL APPROACH TOWARDS DEVELOPMENT**

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**Abstract:** *The paper approaches the cohesion policy from a theoretical point of view. Special emphasis is laid on the theory of multi-level governance. It explores the emergence and evolution of EU cohesion policy in the relevant political contexts of European integration. Secondly, it discusses its logical framework. Thirdly, it explains main concepts of the territorial approach of the policy. The findings are based on literature review and publications in official EU web sites.*

**Keywords:** *Cohesion, cohesion policy, territorial cooperation*

**JEL Codes:** *Z18*

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## COMPARATIVE ANALYSIS OF THE EUROPEAN AND BULGARIAN PROGRAM FRAMEWORKS FOR SECURITY AND DEFENSE

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**Abstract:** *The paper presents the results of a comparative analysis of the European and Bulgarian program frameworks for security and defense, which are outlining the policy at the European and national levels from 2003 to 2025. On this ground, the coherence and differences in prioritization of common problems and shared interests are examined considering the key actors, who are implementing the security and defense policy. The conceptual content analysis of official documents (e.g. strategies, programs, and plans) has been chosen as a relevant method for identifying and analyzing the fields of concordance as well as the gaps between the European and Bulgarian strategic planning basis in terms of priorities and goals with view effectiveness of the anticrisis and security policy, executed at various levels, which are aiming to limit or mitigate the impact of commonly recognized security threats. The national security policy is considered as cross-sectoral and horizontal with integrated nature, encompassing interrelated issues, relationships, and priorities, which have a complex meaning and impact both on the European and the national security system.*

**Keywords:** *Comparative analysis, Strategies, Security, Defense.*

**JEL Codes:** *N40, O20, O38*

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## **DEFINITIVE ASPECTS OF THE CONCEPT "SECURITY"**

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**Abstract:** *Security concepts are a rapidly evolving field of knowledge and which is experiencing significant changes. They are the result of the dynamics of various socio-economic, political, ethnocultural, and technological factors with global impact but also with national and regional reflection. The paper provides a literature review and comparative analysis of the theoretical framework concerning the various definitions of "security" or its interpretations. Based on the examination of the differences and similarities, an attempt to operationalize and unifying of key commonly acceptable features for security and national security are made, with the purpose to derive a current working definition of these terms.*

**Keywords:** *Security, National security, State, Policies*

**JEL Codes:** *D80, D78, H12*

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**NEW SOCIAL RISKS FOR THE BULGARIAN SOCIETY AND THE  
BULGARIAN FAMILY IN THE CONDITIONS OF THE COVID 19  
PANDEMIC**

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**Abstract:** The paper presents the unprecedented structural changes in the Bulgarian society and especially in the Bulgarian family caused by COVID 19 pandemic which will have impact on the future generations. The new characteristics of the global risk societies under the impact of the pandemic are outlined and justified. All observations and conclusions in the text are based on secondary data analysis and author's interpretative analysis of a number of publications on the topic.

**Keywords:** risk society, social risks caused by COVID 19 pandemic, Bulgarian family in risk, transnational family.

**JEL Codes:** Z13

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## ANALYSIS OF THE QUALITY OF LIFE OF THE ELDERLY IN BULGARIA BY INDICATOR "HEALTH CONDITION AND HEALTH STATUS OF THE POPULATION"

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**Abstract:** Statistical surveys of influential European agencies show a steady trend of population aging in the countries of the European Union. This tendency is especially noticeable in our country, and the reasons for this are numerous. Forecasts indicate that by 2070 in Bulgaria the population in the age group over 65 will significantly exceed that in the youngest age group. This creates preconditions for serious changes in both the health and social policy of our country. It is necessary to take measures to maintain a good quality of life for 65 years. The report presents an analysis of the quality of life of the elderly in Bulgaria by indicator "Health status and health status of the population". Based on the analysis, recommendations are made for maintaining and improving the quality of life of older people through social work provided in social services in the community.

**Keywords:** social work, social services in the community, quality of life, the elderly

**JEL Codes:** I10, I14, I31

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## INTEGRATED PEDAGOGICAL APPROACH ON TEACHING AND LEARNING FOR SUSTAINABLE DEVELOPMENT GOALS (SDGS)

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**Abstract:** *In the middle of the severe pandemic of 21st century is an understatement to say that higher education system is looking for new approaches to enrich and adapt its teaching methods to the new environment. Establishing an Educational Laboratory for innovative and integrated pedagogical approach on teaching and learning for Sustainable Development Goals (SDGs) was a blessing in disguise under the new circumstances. Through stimulating social, civic and intercultural skills of our HE students and teachers we've managed to improve our curriculum in subject like Corporate Social Responsibility, Social policy, etc. This paper aims to analyse the result obtained from an empirical research held between Oct-2020 to Jan-2021 based on our work in the Educational Laboratory and to propose valuable recommendations from the lessons learnt from cross-border exchange and knowledge transfer towards sustainable development growth in academia.*

**Keywords:** *Educational Laboratory, Corporate Social Responsibility, Sustainable Development Goals (SDGs)*

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## INTERNAL SOCIAL POLICY OF THE BUSINESS ORGANIZATION AND QUALITY OF WORKING CONDITIONS

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**Abstract:** Socio-labor relations established between employees and employers within the organization are one of the most responsible types of stakeholder interactions. They have a direct impact on the final socio-economic results of the company. It is in the nature of the relationships in question that the true "Corporate Spirit" emerges and the special quality of working life is formed. The true nature of the socially responsible behavior of employers is evident in the internal social policy.

The report examines the complex methodology for the quality of working life by analyzing the development in recent decades of the concession for the optimal use of the labor potential of the individual, his intellectual, creative, organizational and moral and ethical abilities. The subject of interpretation is the substantive and procedural theory of motivation in the general nature of social and labor relations. The use of formal and informal rules for the provision of social benefits for different groups of human resources in the enterprise, their inclusion or non-inclusion in individual employment contracts upon employment is argued.

A specific case for the implementation of the social policy at Kozloduy NPP through the collective labor agreement and the local acts on the basis of the social partnership with the professional organizations in the holding is considered.

**Keywords:** Collective labor agreement, Social investments, guarantees, privileges, compensations

**JEL Codes:** M12, M14, J17, J23, J41, O35

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## METHODOLOGY FOR RESEARCHING THE FACTOR IMPACT OF ANXIETY ON THE CREATIVITY AND INNOVATION OF INDIVIDUALS IN A WORKING BUSINESS ENVIRONMENT

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**Abstract:** *The search for arguments for the positive impact of individual anxiety on their creativity and innovation can give managers an important tool to increase the efficiency and effectiveness of their employees and engineering staff.*

*There is a great interest of the representatives of the top management to prove empirically the statement that the controlled anxiety of the human resources can become a catalyst for solving problems in the work environment, creating new ideas and increasing the productivity of the work done by deploying the creative potential of employees in creating new products and services in business organizations. Significant attention has been paid to psychological, organizational and educational research on the interaction between the categories of anxiety and creativity.*

*The aim of the report is to present for the first time a methodology for establishing the relationships between factors anxiety, creativity and innovation in three aspects: at the organizational, team and personal professional level. So far, separate behavioral or biometric pairs of indicators have been studied.*

*The subject of the study is the behavior of human resources at different levels of anxiety and the degree of creative productivity of teams in business organizations in terms of their creativity and innovation. The object of the research is the development of a methodology for monitoring the results of employees in a real business environment in relation to the three described categories.*

*This will make it possible to establish control over the effective and efficient management of the innovation process in business organizations.*

**Keywords:** *anxious, creative, innovative, innovation process management*

**JEL Codes:** *M12, M14, J24, J53, O35*

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**FRI-ONLINE-MIP**

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**APPLICATION OF THE PEAKS-OVER-THRESHOLD METHOD ON  
ANALYSIS OF GOLD PRICE**

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**Abstract:** Financial markets and financial instruments have experienced many changes during the last decades. But despite these developments, the gold has begun to regain its historical significance in recent years. This study includes a brief introduction to the importance of gold for the global financial system and to the method of surpluses exceeding the maximum threshold, as well as its application in the analysis of the market risk for gold price. A forecast assessment of the Value at Risk and the Expected Shortfalls for the period of years from 2021 to 2030 has been made. An ordinary differential equation and cftool in Matlab were also applied in calculations of the predictive estimates of VaR and ES.

**Keywords:** Gold, Model, XAU, Price, Peak, Over, Threshold, Method, POT, 1971, 2020, ODE, Ordinary, Differential, Equations, VaR, Risk, Value, ES, Expected, Shortfall, New, Bretton, Woods, Matlab, Market, Financial, Risk

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## DIGITAL EDUCATIONAL RESOURCES FOR PROMOTING CREATIVE PEDAGOGICAL PRACTICES

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**Abstract:** *The paper reviews the potential of digital educational resources and games for promoting creative pedagogical practices. Research in the field of learning through digital games and resources avoids the technical potential for achieving an effective learning process - increasing creativity and motivation for students and providing interesting experiences that enhance the interests of students in learning the discipline. To establish the positive impact on digital games to test the creative educational process, it is first necessary to express the concept of the game and to determine its specific components. The game is a natural and favorite activity for people of different ages and backgrounds. The desire to win and have fun determines the strong internal motivation of the players in performing different educational activities.*

**Keywords:** *Education, Games, Creative pedagogical practices.*

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## PROCESSES AND MODELS FOR CREATING DIGITAL EDUCATIONAL GAMES

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**Abstract:** *The paper reviews the processes and models for creating digital educational resources and games. The scientific literature provides many models proposed by game designers based on their professional practice. Different categories of game design methodologies are distinguished. For example, some models focus on the relationship between the game and the player. In this category, the MDA framework - Mechanics, Dynamics, and Aesthetics divides the game into three different levels, ie. mechanics (the formal system of rules and mathematics behind the game, including its various components and their relationships), dynamics (the behaviors of mechanics that occur when the player plays the game) and aesthetics (the player's emotional reactions).*

**Keywords:** *Education, Games, Creative pedagogical practices.*

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## COMPARING SEVERAL FREE OPTIONS FOR SYNCHRONOUS DISTANCE LEARNING IN PANDEMIC CONDITIONS

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**Abstract:** The COVID-19 pandemic forced many schools and universities all over the world to switch to online classes using virtual classroom and video conferencing software. This paper reviews several widely used software systems that can be used for this purpose: BigBlueButton, Microsoft Teams, Google Meet and Zoom. It compares them using several criteria. The conclusion points out their advantages and disadvantages and gives ideas of possible use scenarios. Educators can draw conclusion which system is worth using in their own environment and scenarios.

**Keywords:** Virtual classroom, Conference systems, Distance learning.

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FRI-ONLINE-MIP-05

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## THE POSSIBLE CHOICES OF THE UPCOMING PENSIONERS FROM YEAR 2021

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**Abstract:** Basic concepts, related to the supplementary pension insurance, the rights of the insured persons and their heirs, insurance contributions, are considered. The formulas for calculating lifelong pensions, regulated from March 2021, are shown. It is differentiated when the funds from the individual accounts are paid once and when in installments, when and under what conditions the heirs of the insured persons receive funds.

**Keywords:** pension insurance, supplementary mandatory pension insurance, lifelong pensions, insured persons, heirs.

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## RISK CLASSIFICATION

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**Abstract:** The paper reviews risk and the most common risk categories. The concept of risk is a basic prerequisite for the development of many areas of the financial sphere and the economy. Virtually every investment carries some risk. For most people, risk means a form of uncertainty about the outcome of a situation and the suspicion that the consequences would put them in a worse situation than the current one. A risk situation is a type of uncertainty in which the occurrence of an event is probable and can be determined. Each individual or a company can respond to risk differently. Therefore, risk can be viewed as a complex system that depends on the person and the external factors, so the need for risk classification arises. Risk management is a coordinated process of identifying, measuring, assessing, and reporting the risk exposition as well as determining how to manage the said risks. Risk classification should be understood as the categorization of risk by certain groups and characteristics. Generally, risk can be divided into three main categories determined by – the type of risk, the outcome of the risk and the frequency/severity of the risk. In the paper are presented the main risk types, financial and nonfinancial risks, as well as their subcategories.

**Keywords:** Risk, Classification, Financial Risks, Nonfinancial Risks

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**FRI-ONLINE-ERI**

**FRI-ONLINE-ERI-01**

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**PROPEDEVTICS OF THE CONCEPT OF FUNCTION IN THE  
MATHEMATICS SCHOOL COURSE**

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**Abstract:** Functional dependencies are used in various fields of human activity and to a large extent in science. That is why it is important long lasting competencies related to the concept of function to be built. Since this concept is abstract and complex for learners, a multifaceted early propaedeutic is needed, starting in early primary school grades. The aim of this preliminary/preparatory learning is assimilation the following pieces of knowledge: finding a correspondence between the elements of two sets; tracking the change in the result of the operation when changing one of its components; filling in tables; introduction of letter symbolism; determination of the permissible values of a number indicated by a letter. The junior high school teaching course includes formulas for finding the perimeter and area of studied geometric figures; interpretation of scatter and line diagram; word problems using dependencies between distance, speed, time, price, quantity, total value, etc.; introduction of a coordinate system in the plane; the study of rights and inverse proportionality. A mathematical problem for high school course is presented in order to engage students in active research focused on introducing the concepts of constant quantity, variable quantity and domain of variable quantity change, immediately before studying the basic concept – function. An understandable definition of the term function is proposed.

**Keywords:** propaedeutic, definition of function, change of result, permissible values, variable value, domain of change.

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## DEVELOPING REPORTS WRITING SKILLS

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**Abstract:** *The paper reviews existing types of report, based on different criteria, and shows the necessity to teach students write them effectively and correctly as part of their future professions. It describes the frame structures of different reports. Special attention was paid to the formal language register used in writing reports. The purpose was to describe a wide variety of exercises used for successful teaching students from different degree courses how to write different types of reports according to existing requirements. Structural classification was carried out of different functional reports.*

**Keywords:** *Reports, Writing Skills, Formal Style, Teaching ESP.*

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## STUDENTS' AND TEACHERS' PERSPECTIVES ON PROJECT-BASED LEARNING: FINDINGS FROM A CASE STUDY

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**Abstract:** The present shift towards digitization of education has made it clear that traditional models of education evolve to encompass a range of inquiry-based pedagogical approaches that leverage learner agency and motivational capacity. In response to this paradigm change a project aimed at developing key competences in academic English is launched at Ruse University in Bulgaria. This study which is part of the project seeks to examine the responses of students and teachers to a project-based task that served as a preparation for a student public speaking contest. There are 32 participants in the study and the data was collected via two questionnaires. The results show an increase in student engagement and a good degree of learner satisfaction. Problem areas turn out to be the need for more support provided by teachers and the necessity for further development of critical thinking and information gathering skills. The attested convergence of student and teachers reactions to the project-task is a sound basis for establishing a tradition of annual student public speaking contests at Ruse University.

**Keywords:** Project-based learning, higher education, learner satisfaction.

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FRI-ONLINE-ERI-04

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## ALGORITHM FOR REALIZATION OF PEDAGOGICAL OBSERVATIONS IN A VIRTUAL ENVIRONMENT

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**Abstract:** School observation is a practical and applied part of university pedagogical education, which aims to create conditions for connecting the theoretical training of students with real professional practice, through a series of observations and analysis of phenomena studied theoretically in a particular discipline, in real time. and in a suitable environment. The global pandemic situation seriously hinders observations in all specialties in which this type of educational activity is applied. The rapid pace at which the education system has been able to adapt to the situation has also been supported by innovative teaching techniques and methods.

A similar type of innovation is the realization of classes in pedagogical observation in a virtual environment.

**Keywords:** School observation, pedagogical observation, teacher training, pedagogical innovations.

**FRI-ONLINE-ERI-05**

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**GOOD PRACTICES FOR DISTANCE LEARNING IN BULAGRIA.  
RESOURCES, TOOLS AND PLATFORMS FOR DEVELOPING ONLINE  
TESTS IN EQUATIONS**

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***Abstract:** The paper presents different platforms for effective education in a distance environment. Some good practices for E-learning are described. An example for developing online test for 6<sup>th</sup> grade – section Equations is given.*

***Keywords:** online platforms, equations, distance learning.*

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FRI-ONLINE-ERI-06

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## DEVELOPING ONLINE TESTS IN TRIGONOMETRY WITH SMARTEST

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**Abstract:** *The paper presents the opportunities of training and assessing in Trigonometry by using modern ICT. The main characteristics of the SmarTest platform are described. An exemplary test in Trigonometry for distance learning is given.*

**Keywords:** *SmarTest, Distance Learning, Trigonometry.*

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FRI-ONLINE-ERI-07

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## USE OF INFORMATION TECHNOLOGIES IN TEACHING PARAMETRIC EQUATIONS AND INEQUALITIES IN SCHOOL

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**Abstract:** *The report examines the need to use information technology in the teaching of parametric equations and inequalities in school. The solutions of a parametric equation and a parametric inequality are illustrated with the software product GeoGebra.*

**Keywords:** *parametric equations, parametric inequalities, information technology.*

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## STATE OF THE ART REVIEW OF VOLUNTEERISM

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**Abstract:** *The paper presents a research of the volunteerism in the partner countries of the GGA project - Keep going, reach goals, get an award: Empowering senior volunteerism [www.gogetaward.eu](http://www.gogetaward.eu). The opportunities and the traditions of voluntary work and the best practices are described. The research includes three areas according to the objectives of the GGA project: Data of volunteers; Volunteering and volunteer training policies; Good practices and organisations that are working with older volunteers. The results of the research show that there is a necessity to develop:*

- *an online toolkit for adult educators "Promotion of Older Adults' Organized Volunteerism"*
- *a Senior Award Program with bronze, silver, gold awards.*
- *a Manual for adult educators on how to run the Senior Award Program.*

**Keywords:** *Volunteerism, Volunteering, GGA project, Senior Award Program.*

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**FRI-ONLINE-ERI-09**

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## **A FIVE-LEVEL MODEL OF TEACHING MATHEMATICS BASED ON CONSTRUCTIVISM AND INTERACTIVITY**

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**Abstract:** *This article is dedicated to teaching Mathematics based on constructivism and interactivity. A five-level model of mixed-type teaching is proposed, including passive and active learning methods based on the Learning Pyramid. The model can be applied in the training of students in various mathematical disciplines at universities and students in specialized high schools with a profile in Mathematics. The proposed five-level model is universal. Its main advantage is that it could be easily adapted for successful application in other scientific and cognitive fields, in various educational and qualification levels.*

**Keywords:** *Constructivism, Interactive education, Learning Pyramid, Teaching model.*

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## USE OF A FIVE-LEVEL MODEL OF TEACHING MATHEMATICS ON THE TOPIC APPLICATION OF THE LIMIT OF A FUNCTION FOR EVALUATING INDETERMINATE FORMS

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**Abstract:** This article is dedicated to teaching Mathematics on the topic Application of the limit of a function for evaluating indeterminate forms. A five-level model of teaching of mixed type, including passive and active learning methods, proposed by A. Lecheva, is applied. Interactive teaching methods are used, contributing to the development of constructive thinking, ability to express thoughts, ability to clearly and precisely structure knowledge, ability to communicate with the teacher and other students.

**Keywords:** Five-level teaching model, Limit of function, L'Hopital's rule, Indeterminate forms.

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## USE OF CLOUD TECHNOLOGIES FOR TRAINING AND TEST CONTROL ON THE TOPIC "ELEMENTS OF PROBABILITY AND STATISTICS" IN SIXTH GRADE

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**Abstract:** The article presents the possibilities for using cloud technologies for creating digital learning resources and for conducting electronic tests in the teaching of mathematics in sixth grade. Through the use of the Google applications, digital learning resources have been developed, which are used through a created digital classroom. Emphasis is placed on Google applications and their ability to be used in math education.

**Keywords:** education, mathematics, pedagogy, training, cloud technologies, sixth grade.

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## USE OF CLOUD TECHNOLOGIES FOR TRAINING AND TEST CONTROL ON THE TOPIC "STATISTICS AND DATA PROCESSING" IN TENTH GRADE

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**Abstract:** The article presents the use of cloud technologies for training and test control on the topic "Statistics and data processing" in tenth grade, as well as creating a web-based system of exercises, tests and self-preparation materials for tenth grade math students using of cloud technologies.

**Keywords:** education, mathematics, pedagogy, training, cloud technologies, ten grade.

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## USE OF CLOUD TECHNOLOGIES FOR TRAINING AND TEST CONTROL ON THE TOPIC “CLASSICAL PROBABILITY” IN NINTH GRADE

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**Abstract:** The article presents the possibilities for using cloud technologies for creating digital learning resources and for conducting electronic tests in the teaching of mathematics in ninth grade. Through the use of the Google applications, digital learning resources have been developed, which are used through a created digital classroom. Emphasis is placed on Google applications and their ability to be used in math education.

**Keywords:** education, mathematics, pedagogy, training, cloud technologies, ninth grade.

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## AESTHETICS – A CORNERSTONE IN THE STUDY OF NATURAL LAWS

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**Abstract:** The report discusses the idea of the presence of aesthetic components in natural laws. Such aspects are manifested in the very discovery of these laws, as well as in their formulation and analytical presentation. The symmetries in nature and in the laws of nature, the principle of rhythm, the golden ratio underlie the discovery of aesthetics.

This specificity of natural laws is important in their study. It presupposes the application of different models of education, and becomes a basis for building interdisciplinarity between natural sciences, humanities, and art.

**Keywords:** aesthetics in natural laws, symmetries, rhythm, golden ratio.

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**CARTOONS AND VIDEO CLIPS AS A MEANS OF GETTING  
ACQUAINTED WITH THE SURROUNDING WORLD IN PRESCHOOL  
AGE**

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**Abstract:** The 21st century is characterized by social and technological changes, which necessitate a redefinition of the learning model, especially in the aspect related to the use of information and digital technologies. In this regard, this report analyzes the scientific literature on the impact of cartoons and videos on the acquaintance of preschool children with the surrounding reality, as well as on the formation of social and cognitive horizons. Some of the most popular among Bulgarian children series of animated films and videos are exhibited. Animation, sound, video, new 3D technologies will make the perception of information unusual, different and interesting, arousing their enthusiasm, unlocking positive emotions. We believe that their inclusion in the traditionally conducted learning process will help make it from boring and monotonous to more attractive, stimulating and activating creativity, logical thinking, supporting the formation of social skills and those for practical problem-solving.

**Keywords:** Cartoons, video clips, education, social and cognitive skills, preschool age.

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## FORMATION OF COGNITIVE SKILLS FOR CODING AND DECODING IN KINDERGARTEN

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**Abstract:** The abilities for using symbols are very important in our technological society. Moreover they are essential for psychological development. The symbol is a tool for psychological activity. Therefore the development of skills for coding and decoding through pictograms is an important part of teaching math in kindergarten. However there is a lack of methodological recommendations in this respect. In this context the main purpose of current paper is to systematize exercises for coding and decoding that gradually become more complicated. They are accompanied by methodological recommendations. The abilities to use symbols are an important prerequisite not only for learning math but also for successful school education. In addition the children feel joy while coding and decoding. Thus learning becomes both developing and enjoyable.

**Keywords:** coding, decoding, symbols, teaching math in kindergarten.

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## STEM EDUCATION IN VIDIN AREA

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**Abstract:** *Real-world jobs are interdisciplinary. Rarely does a job require just one set of knowledge and skills. Many specialists from different scientific fields and with different professions use science, mathematics, engineering, technology and art in their daily work. That is why there is a need to think about how to teach children in different scientific disciplines to integrate and work together. We do not need to insist that they remember different facts. We currently have unlimited access to many sources. Learning each of the "ingredients" of STEM has long been part of formal education. The traditional classroom system required that the subjects be taught separately, without connection to each other. In this model of learning, students are largely passive, knowledge is standardized, assessment requires the reproduction of subject knowledge, without necessarily being correlated with real-life problems.*

**Keywords:** *STEM, Formal Education, Teacher, Students, Classroom.*

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## PROVISION OF EARLY CHILD DEVELOPMENT SERVICES IN SMOLYAN MUNICIPALITY

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**Abstract:** Real-world jobs are interdisciplinary. Rarely does a job require just one set of knowledge and skills. Many specialists from different scientific fields and with different professions use science, mathematics, engineering, technology and art in their daily work. That is why there is a need to think about how to teach children in different scientific disciplines to integrate and work together. We do not need to insist that they remember different facts. We currently have unlimited access to many sources. Learning each of the "ingredients" of STEM has long been part of formal education. The traditional classroom system required that the subjects be taught separately, without connection to each other. In this model of learning, students are largely passive, knowledge is standardized, assessment requires the reproduction of subject knowledge, without necessarily being correlated with real-life problems.

**Keywords:** STEM, Formal Education, Teacher, Students, Classroom.

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## DEVELOPING CREATIVITY OF STUDENTS WITH STEALM APPROACH

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**Abstract:** The paper reviews existing theories and methods for development of the creative potentials of the student by STEALM approach in education. This article is an overview of the conceptions for creativity, creativity process, STEM, STEAM and STEALM in contemporary education.

**Keywords:** STEM, STEAM, STEALM, Creativity, Problem-solving Situations.

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## THE PROCESS OF FORMING THE SOCIAL IDENTITY AND POSITION THROUGH EDUCATION

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**Abstract:** This paper examines the social identity formation and socialization as a process through theoretical analysis of different scientific concepts in psychological and educational context; the important role of the teacher through the formation of students' identity, as well as the conditions and prerequisites that the educational environment has to facilitate this process have been highlighted.

**Keywords:** Theories of Socialization, Social Identity, Social Position, Educational Process.

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## CONTEMPORARY STATE OF THE ORGANISATION OF PRESCHOOL EDUCATION IN ENGLAND

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**Abstract:** The paper presents the current state of the organisation of preschool education in England. The main focus is on funding, access and provision for Early Years Foundation Stage which is available for three- and four-year-olds and some two-year-olds. A review is made on the current Curriculum Guidance for Early Years Foundation Stage, including the areas of learning and development, the effective teaching and learning methods and assessment.

**Keywords:** Early Years Foundation Stage, Preschool Funding and Access, Curriculum Guidance

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## STRUCTURAL POSITIONING AND PRACTICAL DIMENSIONS OF VOLUNTEERING IN THE CONTEXT OF SOCIO-PEDAGOGICAL WORK WITH DISADVANTAGED CHILDREN

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**Abstract:** *The current challenges before the socio-pedagogical work with children and youth, who are in a state of inequality, require the appropriate consideration of the existing strategies and approaches for the implementation of the supportive activity, oriented to the considered target groups. Key in this regard is the issue of clarifying the positional determinism of the so-called secondary levels of support and especially of those related to the voluntariness and free initiative of members of civil society. The report presents the main definitive aspects of volunteering as a conceptual construct. The most important parameters of the structural positioning and the practical dimensions of volunteering as an aspect of the helping activity are analyzed. Such a research perspective is needed in order to find appropriate solutions to the problem of intensifying the processes of social cohesion and achieving the necessary synchronization and effectiveness in the actions of formal social support systems, informal structures and individuals engaged in activities in the field of socio-pedagogical work with specific target groups of adolescents.*

**Keywords:** *Volunteering, Functional aspects, Definitive markers, Practical dimensions, Structural positioning, Supporting socio-pedagogical activity, Children in disadvantaged situations.*

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## PARENTS' KNOWLEDGE OF CHILDREN'S RIGHTS

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**Abstract:** Each of us is born free, with equal rights and dignity. Children, just like adults, have their rights and responsibilities. The children's rights described in the The United Nations Convention on the Rights of the Child are part of the domestic law of Bulgaria and ensure that children are protected by law. Parents, teachers, as well as various institutions make efforts to respect the rights. The object of study of this article is which rights parents indicate as basic; their awareness of children's rights as part of the learning process; parents' views on textbooks related to the teaching of rights, as well as the involvement in the process of teaching the rights of older students and various state institutions. Two hypotheses can be made - that parents are aware of their children's rights; that they have no difficulty in stating the basic rights of the child; that they can point in which specific subject relevant topics are discussed at the initial stage of education. The second hypothesis should claim that parents find it difficult to name children's rights and are not sufficiently informed about them. For the purpose of this article, a survey was conducted among 56 parents of children up to 4th grade, the results of which support the second of the two hypotheses and lead to the conclusion that parents need to raise awareness regarding children's rights.

**Keywords:** rights of the child, origin of rights, convention, fundamental rights, rights of the child within the educational process.

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## APPLICATION OF TRAINING IN HIGH-TECH FACILITIES FOR SUPPLEMENTARY AND ALTERNATIVE COMMUNICATION FOR STUDENTS FROM SUPPORTING PROFESSIONS

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**Abstract:** *In the context of policies in Bulgaria in the field of inclusive education and work with older people with disabilities, the question of the use of high-tech means for augmentative and alternative communication is increasingly raised. Augmentative and alternative communication includes all methods of communication that complement or replace speech or writing in people with impaired generation or comprehension of oral and written speech. The people in Bulgaria who can improve their communication through AAC are approximately 150,000 people. Among them are children and young people with a cerebral palsy (CP), with autism spectrum disorders, Rett syndrome, muscle dystrophies, developmental disorders, Down syndrome, as well as adults who have suffered a stroke, etc. An important part of the successful use of these tools is the training of professionals from supporting professions in order to more successfully communicate with children and adults with disabilities.*

**Keywords:** *augmentative and alternative communication, children and adults with severe physical disabilities, supporting professions*

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FRI-ONLINE-PP-11

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## CHALLENGES OF ONLINE LEARNING OF SOCIAL PEDAGOGUES IN A UNIVERSITY ENVIRONMENT

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**Abstract:** Life in the last year (from March 2019 to the present-August, 2021) passes under the sign of the global epidemic of COVID-19. The period will be remembered with a state of emergency, with bans, with the initial reaction of children and adults, marked by panic and fear of the introduced measures of restrictions, etc. The anti-epidemic measures prescribed by the Bulgarian authorities affect all members of society, including children, families, workers and the elderly. With the present material an attempt has been made to gather information (through a survey) about the difficulties that students have encountered in online learning.

**Keywords:** COVID-19, with bans, with the initial reaction of children and adults.

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Ilieva, B., G. Atanasova, THE STUDENTS' CHALLENGES OF E-LEARNING IN A FAST-MOVING ENVIRONMENT - BULGARIAN HIGH SCHOOL DIGITALIZATION REVIEW. EDULEARN21 Proceedings, ISBN: 978-84-09-31267-2.

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**THE LANGUAGE USED BY MOMCHILOV IN HIS TRANSLATION OF  
SACRED TEXTS (SPELLING FEATURES)**

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**Abstract:** The report focuses on the language used in biblical texts and their translation into Bulgarian by the Bulgarian Revival teacher, writer and publisher Ivan N. Momchilov. The translations are included in the short story collection "Tsarkoven tsvetnik" ("Liturgical Anthology"), published by "Knigoprodavnitsa Momchilov & Co." in 1869. It is the only book by the outstanding Bulgarian Revival writer, printed entirely in Church Slavonic Cyrillic. The report examines the most important spelling rules of these texts, offering a comparison between the Church Slavonic spelling rules and the set of linguistic norms and rules exemplified in Ivan N. Momchilov's book "Grammar of the New Bulgarian Language", printed in 1868 in Ruse.

**Keywords:** history of the contemporary Bulgarian literary language; slavic literary language; Ivan N. Momchilov; languagespelling model; dialect; literary tradition.

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## PHRASEOLOGY, TRANSLATOLOGY AND PHRASEODIDACTICS – ISSUES RELATED TO FOREIGN LANGUAGE TEACHING

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**Abstract:** The purpose of this study is to look for the intersections between the adopted practices of translating (translatology/ translation studies) phraseological units from one language to another and the most effective ways of doing this from a methodological point of view with reference to teaching it in a foreign language. Such an approach is, therefore, oriented towards phraseodidactics which integrates the theory of phraseology and its translation on one hand with teaching it on a practical level on the other hand - an underdeveloped field among the Bulgarian research community.

**Keywords:** Phraseology, Translatology, Phraseodidactics, Teaching phraseology in a foreign language

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## ERRORS IN THE USE OF THE NUMERICAL FORM OF NOUNS IN BULGARIAN

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**Abstract:** The current paper discusses some of the reasons for systematic errors in language use – wrong use of the numerical form of masculine nouns. The excerpted errors in the use of the numerical form are presented in the following categories: use of the numerical form of nouns that identify a person after cardinal numbers instead of the plural form of the noun; incorrect use of the plural form of nouns after a cardinal number or an adverb such as “kolko” (how many), “nyakolko” (several / few / a few / some), “tolkova” (this / that / so / many) instead of the numerical form; errors in the use of the masculine numerical form of the cardinal numbers.

**Keywords:** numerical form, codification of the numerical form, errors.

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## ONLINE EDUCATION – MISSION (IM) POSSIBLE

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**Abstract:** *The paper reviews the results of research on Generation Z's attitude to digital education in distance learning, teenagers' access to the internet and personal digital devices availability. The research was part of the school eTwinning project "Online education- mission (im)Possible" which was run in the period October 2020 and April 2021. Schools from five countries expressed their readiness to enter the project however, only three of them took part in the survey: Bulgaria (the National school of Arts "Prof. Vesselin Stoyanov", Ruse), the UK (St Peter's Catholic Academy, Bournemouth, United Kingdom) and Slovenia (OŠ Ivana Cankarja, Vrhnika, Slovenia). The project and the research relate to certain Goals set by the UN, such as "Quality Education", "No Poverty", "Gender equality", "Good Health and well-being".*

**Keywords:** *General education, Online Learning, Generation Z, UN's Global Goals.*

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**THE MAIN CHARACTER OF THE JEANSE PROSE NOTES ON  
„SHORT SUN” BY STANISLAV STRATIEV AND „ADIOS MUCHACHOS”  
BY VASIL CONEV**

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***Abstract:** The paper reviews the role of the main character of the jeans prose who is a young person, distant to the habits of the society. He confronts not only the elder persons but everybody who deny universal moral values. The main character of the jeans prose is a distant heir of the main character of the novel of the Romanticism. That is why the paper is focused on the common signs between jeans prose and the novel of Romanticism and the main characters of the two types of prose.*

***Keywords:** Stanislav Stratiev, Vasil Conev, slavonic literature, jeans prose.*

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FRI-ONLINE-LL-06

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## WORLDVIEW AND IDEOLOGY IN THREE ENGLISH FAIRY TALES – A MULTIDIMENSIONAL APPROACH

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**Abstract:** *The purpose of the present study is to investigate the predominant value orientation and worldview of three English fairy tales (Jack and the Beanstalk, Jack the Giant Killer and Jack and His Magic Snuffbox) included Joseph Jacob's English Fairy Tales. By exploring the linguistic evidence which the texts have to offer, i.e. the specific linguistic constructions and choices made by the author within the texts, I try to reveal the culturally shared cognition and values that can serve as pointers to a culture's worldview and predominant ideology, typical of a given period. More specifically, the study investigates the text value orientation as revealed by the level of the story (actants and action, time and setting)) and the level of narration (characterization).*

**Keywords:** *narrative analysis, linguo-cultural studies, value orientation, worldview, fairy tales.*

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## HIPOLIT NAPOLEON (HENRYK) DĘBICKI IN RUSCHUK

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**Abstract:** The paper presents several arguments concerning the identity of Polish illustrator Hipolit Napoleon Dębicki, popular in Romania and Bulgaria under the name of Henryk Dębicki. It throws light on his role in the Polish January Uprising of 1863, his subsequent hard labour in Tomsk and escape to Romania via Turkestan. It also reveals a note from the unpublished memoirs of Polish engineer Zygmunt Mineyko, proving that in 1869 Dębicki spent several months in Ruschuk, the capital of the Danubian Vilayet. This note is the sole evidence that the artist had visited the lands of present-day Bulgaria. In addition, Mineyko's note is testimony to the fact that in Ottoman Ruschuk in 1869 there were enough clients willing to commission portraits, thus ensuring modest earnings to an European painter.

**Keywords:** Hipolit Napoleon Dębicki, Henryk Dębicki, 1869, Ruschuk, Ruse, Danubian Vilayet, Polish painter.

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FRI-ONLINE-LL-08

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## ONLINE LEARNING OF HISTORY SUBJECTS FOR STUDENTS IN „ANGEL KANCHEV“ UNIVERSITY OF RUSE – IMPEDIMENTS AND BENEFITS

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***Abstract:** The present Report presents the used forms, methods and online resources in the work with students in History subjects at “Angel Kanchev” University of Ruse during their online education in the context of pandemic. The impediments and the benefits arising in digital environment and during online working process are given special attention to. The author makes an attempt to systemize the basic methods used in the work with the students that contribute to higher degree of motivation and success in History education.*

***Keywords:** Students, History education, forms, methods, resources, motivation.*

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## **SURROUND SOUND IN DOCUMENTARY FILM**

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**Abstract:** *In recent years the aesthetics of fiction films influences more and more the sound of the documentaries. It elevates it to a whole new level but in the same time raises new problems. The most significant of them are these, concerning authenticity of the story in a non-fiction film. The use of the multi-channel surround sound formats in the documentary makes differences between this two genres smaller than ever.*

*Since the demarcation line of the concept of "modernity" shrinks and expands, in aesthetic and formal terms, depending on the receivers' intuitions, it is appropriate to specify that we accept P. Sondi's view of modern drama which is related to a model of writing drama in the late 19<sup>th</sup> century created and defined by Ibsen, Strindberg, Maeterlinck, and Hauptmann's dramas.*

**Keywords:** *Documentary, Sound design, Cinema, Film Sound, Surround sound.*

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## THE STYLE CONCERT IN THE PEDAGOGICAL PRACTICE OF PANKA PELISHEK (1899-1990)

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**Abstract:** Panka Pelishek is one of the iconic names of the Bulgarian musical culture of the last century. She is one of those successful teachers whose initial contribution provides the opportunity to be considered in different contexts - cultural, pedagogical, historical, artistic, etc. and this is the main perspective in the proposed report. Intensive pedagogical activity includes Pelishek in the current debate on the aesthetic platform and the guiding principles in our national school. The pianist compares the young Bulgarian piano school with the European high traditions. The report focuses on one of the main lines in the teaching practice of Prof. Pelisek. The text offers two semantic lines: a) the stylistic concert as a procedure of the elaboration of one of the main lines in the pianist's teaching method; b) the specific concert practice of the one-style program as a significant socio-cultural act of the last century. In this context are presented for the first time original archival materials from her personal collection, which build the foundation of authentic factology and knowledge of the overall and significant presence of the pianist in the musical and cultural life in our country from the last century.

**Keywords:** Panka Pelishek, Piano school, National piano school, Bulgarian musical culture, Style concert.

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## SINGING SPEECH AS AN ACOUSTIC PHENOMENON

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**Abstract:** *The human voice is the most perfect musical instrument, and the most ancient known to mankind. This article examines some characteristic features of singing speech in terms of acoustic sound patterns. Sound production, respiration, frequency response of vocal emission, body resonators and the physical aspects of specific artistic performance techniques are only part of the acoustic problems of human singing.*

**Keywords:** *singing voice, human voice, formants, resonators, modulation, vibrato.*

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## RECORDING MUSIC ON SET – SPECIFICS AND CHALLENGES

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**Abstract:** *The paper focuses on the specifics of recording music on movie set. It will address the various challenges for the sound engineers when recording music on set - on one side, the limited choice of microphones and techniques. On another the limitations introduced by costumes and decor and the solutions related to those. It also addresses the choices related to structuring the music performances on set with respect to video editing of the scene in post-production and at the same time enabling using the music recorded on set for multi channel mixing.*

**Keywords:** *Movie, Sound recording, Microphones, Film sound, Music recording.*

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## EVOLUTION OF MUSIC AS AN ELEMENT OF THE ANIMATION FILM SOUND DESIGN

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**Abstract:** *Being a part of the movie experience from the very beginning, music has a key role of its evolution. Animation films are not an exception. Here the symbiosis between music and image is even more significant. Music is closely linked to characters' appearance and movements. During the various stages in the history of animated cinema, music as a means of expression has evolved, retaining some of its main characteristics and adding new ones in accordance with the new audience expectations.*

**Keywords:** *Animation film, Sound design, Cinema, Film Sound, Music.*

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## TEACHING SPECIFIC KNOWLEDGE OF MUSICAL INSTRUMENTS THROUGH CREATIVE TASKS IN PRIMARY SCHOOL AGE

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**Abstract:** The paper focuses on a comprehensive approach for presenting specific information about musical instruments to primary school students. The stimulation of children's imagination is a pre-requisite for the development of long-term impressions, knowledge and interest in music and musical instruments. The paper examines the use of thematic music material as a basis and a starting point for suggesting a set of creative games and tasks covering all curriculum topics. The proposed approach allows for the acquisition of knowledge about the specific sound characteristics of musical instruments and musical terminology in an original and accessible way. Their implementation in the primary school classroom is presented through learners' direct participation in the music education games and creative tasks.

**Keywords:** Music education, musical instruments, primary school education, music education games, creative music tasks, experimental practices of music education.

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FRI-ONLINE-AS-07

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## EDUCATIONAL POTENTIAL OF MEDIA FORMATS AND ELECTRONIC DISTANCE LEARNING PLATFORMS IN FINE ARTS

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**Abstract:** The extraordinary pandemic conditions put to a real test the readiness of the Bulgarian educational system to respond adequately to the necessity for developing certain knowledge, skills and competencies in the students. The forced removal of the educational process from the "comfort" of the real classroom and its implementation entirely in the electronic environment for distance learning provided an opportunity to monitor and analyze the extent to which the provisions of the updated Bulgarian legislation in the context of digitalization of this process can be applied successfully in pedagogical practice. The report observes the features, obstacles, as well as the optimal solutions for distance learning in fine arts. An author's set of multimedia formats for teaching this subject in the primary school stage is presented and a comparison is made with the resources that other author teams have provided in the electronic versions of their books. The applicability of the media formats in terms of widely accessible platforms for asynchronous and synchronous learning in online environment is analyzed.

**Keywords:** education, fine arts, distance learning, media formats in electronic books, web-based educational platforms.

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## **FILM EDITING IN ITS ROLE AS A SUPPORTING FACTOR FOR INTERPRETATIONS OF THE ACTORS**

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**Abstract:** *The emotional impact of each film has its most direct expression through acting. Through the incarnations of the actors, the viewer identifies with the individual characters, lives with them and gets excited about their stories on the screen. The stronger this identification, the more frustrating are the moments when the viewer feels a slight falsehood or illogical behavior in the actor's play. Often the footage of the film may contain a much better performance of the actor, but for one reason or another it will not be seen and used by the editor in the construction of a particular scene or action. The article will look at the process of final structuring the film characters through the means of editing, the correct choice of doubles and the handling of different sizes and points of view.*

**Keywords:** *Movie, Film editing, Montage, Actors.*

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FRI-ONLINE-AS-09

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## DO SCIENTISTS DREAM ABOUT ENGINEERED HUMANS? FICTIONAL REPRESENTATIONS OF THE CONTROLLED PATIENT

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**Abstract:** *From Frankenstein's monster stitched from body parts to the stories of humans engineered in a clinical environment and characterized by the phrase 'more human than a human', science fiction film astonishes us with a gallery of human-made monsters, experimental genetic modifications, androids, humanoids and replicants, produced to serve a simple role: to replace the real human in hard work labor, wars, conquests, or organ-donation; or to be used as passive slaves controlled by a daily dose of drugs. Looking at the diversity of artificial humans as screened by films as Frankenstein (1931), Metropolis (1927), Gattaca (1997), Blade Runner (1982), Android (1982) and The Island (2005), I analyze the outlook of the artificial human being as constructed by different design practices and I comment on the transition from a person to a state of a patient as proposed by the narratives.*

*The genre presents two of the most fearful technophobic stories that the man-created being, the product of the experimental science is a prelude to our extinction; and that instead of a master the creator will end up as a slave of his own creation. In the age of genetically modified babies and the possibility to produce our clones, the themes address present and basic ethical questions. Should we create our copies just to use them as slaves? Will this practice help us to return to our own humanness or will we lose our freedom just ending in something as predicted by THX 1138 (1971) or The Matrix (1999)?*

*This paper examines the visual representation of the 'engineered human' as depicted by a number of science fiction films and comments on the changing state from person to patient posing the ethical question: Is it worthwhile to produce our copies if we do not give them the right to live a normal human life?.*

**Keywords:** *visual representation, engineered human, controlled slave, science fiction film, design practice.*

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**FRI-ONLINE-HP-01**

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**MOTOR DIFFICULTIES IN SCHOOL IN CHILDREN WITH NEUROLOGICAL DISEASES**

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**Abstract:** Motor disorders in children are most often associated with neurological diseases or congenital malformations. They occupy a central place in modern neurorehabilitation and pose a challenge to health professionals due to the high frequency and accompanying neurological deficits that affect the developing organism. However, the child with a physical disability must lead a dignified life, encouraging independence and active participation in society. To achieve all this, an important role in the child's life is played by the kindergarten and the school. Timely diagnosis and adequate therapeutic and pedagogical approach are a guarantee for optimal results and a more favorable late prognosis, in view of the school and social adaptation of these children.

**Keywords:** Neurological Diseases, Motor Disorders, Cerebral Palsy, Muscular Dystrophy, Spina Bifida, Inclusive Education.

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RECONSTRUCTION OF MM.FLEXOR DIGITI MINIMI LONGUS ET BREVIS  
– A CASE REPORT

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**Abstract: Intoduction** The flexor tendon rupture is designed for every surgeon by hand. The reconstructive goal is to provide stable coverage of all structures and to preserve their function. (Wolff G., 2020). Both surgical intervention and prohibited process is a difficult and complex process. Surgical introduction has a particularly important role in the final results and outcome of surgical treatment. The rehabilitation process must be specified very carefully between the protections on the reconstructed tendon and the prevention of adhesions. (Singh R., 2015) The most common postoperative complications are associated with flexion contractures in the proximal interphalangeal joint (PIJ) and distal interphalangeal joint (DIJ), as well as tendon rupture in early active movements. (Starr M., 2013) **Expose** The present clinical case concerns a 37-year-old man with a rupture of mm.flexor digiti minimi longus et brevis, as a result of a blow to the palm with a sharp object and preserved skin surface without injury. The patient was admitted for surgical reconstruction, during the operation of which the proximal end of the long flexor was not found. It is submitted for re-reconstruction after 3 weeks. The operation in the individual patient was performed in zones II and IV under regional venous anesthesia with added superficial sedation at the end of the operative time. The flexor tendons were sutured with a block and a four-layer suture with 0000 Tendoloop sutures was performed (the Kessler method was repeated twice). The strength of the suture, the mobility of DIJ, PIJ and MKFJ, as well as the tendon excursion were checked intraoperatively. The kinesitherapy protocol included cryotherapy, anti-edema massage and application of a boar, passive movements for ICFS, PIJ and DIJ, active movements for the same, as well as for the wrist joint. After the 5th postoperative week, reciprocal inhibition for relaxation and normalization of the mm length was included. flexor digiti minimi longus et brevis. After the 6th week, exercises with an elastic band for the wrist and fingers were included. Rehabilitation procedures were performed 3 times a week with a physiotherapist. Every day, the patient performed at home a previously studied kinesitherapy complex of active exercises 4-6 times a day. The values of goniometry, centimeter, visual - analog scale (VAS), Boyce, opposition thumb - puppy and DASH test - on the 2nd postoperative day and at the end of the 8th postoperative week were reported twice. The obtained results were compared with those reported on a healthy hand. **Conclusion** The considered clinical case and its successful recovery for a short period of time without the presence of postoperative complications and residual functional deficit, gives reason to believe that the operative reconstruction with a four-barrel suture with thread 0000 per mm. flexor digiti minimi longus et brevis, provides good stability, suture strength and provides excellent tendon slippage. Also, a kinesitherapy program based on short and frequent active movements, passive movements, cryotherapy and massage are suitable methods for fast and effective recovery of patients after mm reconstruction. flexor digiti minimi longus et brevis four-barrel seam with thread 0000.

**Keywords:** flexor tendon, m. flexor digiti minimi longus et brevis, tendon reconstruction, physiotherapy

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## AIDS IN INCLUSIVE EDUCATION AND INTEGRATION IN CHILDREN WITH MOTOR DEFICITS

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**Abstract:** Access to education and the availability of a supportive environment for children with disabilities who have special educational needs (SEN) are prerequisites for equality and equal opportunities. Integrated learning focuses on the opportunity for children with SEN, and inclusive education focuses on changing the environment, not the individual. Alternative technological solutions are diverse in terms of overcoming the motor barriers of mobility and positioning in the school environment. Aids and technologies can facilitate certain activities indirectly (through treatment or therapy) or directly (through physical assistance), improving children's mobility and providing a prerequisite for communication, writing and reading. Through various technical solutions, conditions are created for the independence of children, which increases their desire and ability to develop, learn and play together with their peers. An inclusive school must be inclusive for everyone in it - both children and adults - teachers, principals and parents, because "If we do not study together, then how will we live together in society?"

**Keywords:** special educational needs (SEN), inclusive education, integration, aids and technologies, motor deficit

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## DEVELOPING A SYSTEMATIC APPROACH FOR INCLUDING OCCUPATIONAL THERAPY IN INCLUSIVE EDUCATION

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**Abstract:** The presence of an occupational therapist as part of the team in inclusive education settings is a long-standing practice in a number of European and other countries, but still not fully represented in Bulgaria. Most children with disabilities can be educated in mainstream schools with the necessary additional support and accessible environment. In addition to working directly with children, the occupational therapist can be a full member of the team for assessing the individual educational needs of the child. A systematic approach is needed in order to promote his role in school environment and inclusive education. The presented approach will serve as a basis for scientifically based inclusion of occupational therapy specialists in inclusive education.

**Keywords:** occupational therapy, inclusive education, systematic approach

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EFFECTS OF MEDICAL REHABILITATION IN ADULTS AND OLD PEOPLE  
WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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**Abstract:** Aging is a complex process and extremely diverse, with changes occurring at very different levels of functioning. Medical rehabilitation in geriatrics is more complicated and complex than in the young contingents, because here the possible changes due to age are taken into account. Because the elderly tend to have countless physical or psychological disorders, it is very important to take a precise approach to treatment. Countless stresses that often affect them lead to the phenomenon of "learned helplessness". Individuals pass along control over personal things and become dependent on others to take care of them and provide for their needs. The age-related changes that occur significantly affect the respiratory system of the elderly and lead to a decrease in its functional fitness. There are a number of features that must be taken into account when applying medical rehabilitation.

**Keywords:** aging, medical rehabilitation, treatment, geriatrics, respiratory system.

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## CONTEMPORARY ASPECTS OF PHYSIOTHERAPY IN DOWN SYNDROME

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**Abstract:** *This review article examines the importance of kinesitherapy to improve children's functional opportunities with Down syndrome. Down syndrome is the most common chromosome disease worldwide, resulting in structural and functional defects. Thanks to kinesitherapy, the duration and quality of life of children with Down syndrome significantly increased.*

**Keywords:** *Physiotherapy, Etiology, Frequency, Clinical Picture, Treatment*

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## MOTOR THERAPY AS PART OF COMPLEX REHABILITATION IN CHILDREN WITH AUTISM AND HYPERACTIVITY

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**Abstract:** Autism is generally defined as a type of generalized developmental disorder that affects the development of the brain, hence human behavior, and manifests itself in the first three years of life as abnormal development with specific characteristics. Research focuses on a variety of clinical, genetic, neurological sources and the environment. In over 80% of those affected, the cause remains undisclosed. **Material and methods:** The study was conducted from May 2019 to May 2021. The medical research contingent includes children with autism or children with autism spectrum disorders who attend a day center for children and young people with disabilities "Winnie the Pooh". Experimental group - A, includes 6 children under 10 years of age (3 girls and 3 boys). Experimental group - B, includes 9 children over 10 years of age (2 girls and 7 boys). **Results:** Based on the conducted therapeutic course, it can be summarized that motor therapy has a beneficial effect on all subjects by contributing to increased motor activity, further development and strengthening of motor skills. There was a significantly better response in terms of motor activity, muscle tone and psycho-emotional state compared to the beginning of the study.

The report was developed under a project of the Research Fund of the University of Ruse "Developing a systematic approach to including occupational therapy in inclusive education."

**Keywords:** Motor therapy, Complex Rehabilitation, Children, Autism, Hyperactivity

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## FRACTURES OF THE POSTERIOR MALLEOLUS-OUR TREATMENT PROTOCOL

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**Abstract:** The paper reviews a treatment protocol for the posterior malleolus fractures. The indications, advantages and limitations of the direct posterior approaches are discussed and evaluated in a series of 25 ankle fractures treated for a period of 5 years. The average age of the patients is 50 years, there are 11 males and 14 females. They are followed up for a period ranging from 6 to 18 months. All fractures have united for an average period of 9 weeks. Sixteen of the patients had excellent, 5 had good and four had average functional results. There were no major complications. Five patients developed skin necrosis along the operative incision. The fibular plate was removed in 10 patients, 3 limbs had significant swelling, one patient had disfunction of the sural nerve. Operative treatment is recommended in case of posterior cortical collapse, intercalated articular fragments and fibular incisura disruption. Postero-lateral approach is indicated in the majority of the cases. Postero-medial approach is suitable for combined posterior and medial malleolar fractures, without articular impaction.

**Keywords:** posterior malleolus fracture, direct approach, treatment protocol, functional results

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## FRAGMENT SPECIFIC FIXATION OF TIBIAL PLATEAU FRACTURES

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**Abstract:** *Fragment specific fixation is the current paradigm in the treatment of tibial plates fractures. It allows immediate rehabilitation and better functional results. We present the results of 12 complex plateau fractures operated according to this new concept for a period of 7 years. They were graded according to the AO classification. Eight cases were type 41C3, three cases were type 41 B3 and one was type 41B2. The functional recovery was rated according to the criteria of the Knee Society Clinical Rating Score. The quality of reduction was assessed according to Rassmussen. The average follow up was 10 months. All fractures united for an average period of 3,5 months. The average ROM was 120°, the average functional rating was 92. There were no serious intraoperative complications like DVT or infections. The common perineal nerve was intact in all of our patients. The most frequent complication of a flexion contracture in 3 cases, followed by knee instability in one case and partial skin necrosis in one case. There were no late features displacements. We believe this is a testament of the viability of the fragment specific concept.*

**Keywords:** *tibial plateau fracture, fragment specific fixation, rim plate, functional recovery ,complications*

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FRI-ONLINE-HP-10

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## INVERSION OF LUMBAR LORDOSIS IN SPORTY WOMAN OF 29 YEARS OLD. TREATED WITH B.A.E. METHOD: CHECKED AFTER 11 MONTHS

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**Abstract:** Postural alterations of the rachis in female of 29 years doing underwater activity. The girl reports frequent lumbar back pain and hip and lower limb pain from the age of 18. She has been treated with biomechanical anthropometric ergonomic method (B.A.E.) with positive results. **Method:** Girl previously treated with physiotherapeutic protocols of the official medicine with negative results for many years. During the medical and physiotherapeutic management the pain improved only for short periods under treatment, was treated with the biomechanical anthropometric ergonomic method for 11 months with positive outcomes on both mobility and pain. She went back to sports after 3 months of B.A.E. treatment.

**Keywords:** Posture, Biomechanical Anthropometric Ergonomic Method, scoliosis, back pain, lower limbs pain.

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Tiziano Pacini, Elisabetta de Juliis, Andrea Pacini: Thermography and Posture: The thermography allows to see the change of muscular muscles of the various body parts in real time.

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Tiziano Pacini, Elisabetta de Juliis, Ferdinando Pivetta, Implications of the Posture and of the gravitational field management in the Fibromyalgia and in its symptoms of pain and panic: progress test in the treatment of a 48 fibromyalgic man with the Biomechanic Anthropometric Ergonomic Method B.A.E. for 18 months, University of Ruse “Angel Kanchev”, 2019

FRI-ONLINE-HP-11

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SCOLIOSIS IN A FEMALE OF 56-YEAR-OLD WITH HIP PROSTHESIS.  
TREATED WITH B.A.E.METHOD: 12 MONTHS VERIFICATION

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**Abstract:** Postural alterations of the rachis in female of years 56 who has undergone right hip surgery nine years ago. The person reports continuous lumbosacral back pain and hip pain with persistent burning in the right buttock. It has been treated with biomechanical anthropometric ergonomic method (B.A.E.) with positive results. **Method:** woman previously treated with physiotherapeutic protocols of the official medicine with negative results for many years. During the medical management and physiotherapy the pain did not improve, it was treated with the biomechanical anthropometric ergonomic method for 12 months with positive results on both mobility and pain.

**Keywords:** Posture, Biomechanical Anthropometric Ergonomic Method, scoliosis, back pain, surgery with hip prosthesis.

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Pacini T., Biomechanical Anthropometric Ergonomic Method for Assessment and Correction of the Human Posture, PhD Thesis, University of Ruse “Angel Kanchev”, 2015

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Tiziano Pacini, Ferdinando Pivetta, Elisabetta de Juliis, Neck's posture: woman 54 years old suffering from Dizziness, Labyrinthitis, Headache, Neck Pain, Shoulder Pain, Carpal Tunnel Syndrome, treated with Biomechanical Anthropometric, University of Ruse "Angel Kanchev", 2013

Tiziano Pacini, Elisabetta de Juliis, Andrea Pacini: Thermography and Posture: The thermography allows to see the change of muscular muscles of the various body parts in real time. A person shows at the thermography investigation a muscular surface that is detectable as an image proportional to the quantity of heat emitted by the muscles and by their work. Its usage can be studied in association with the B.A.E. method, University of Ruse "Angel Kanchev", 2019

Tiziano Pacini, Elisabetta de Juliis, Ferdinando Pivetta, Implications of the Posture and of the gravitational field management in the Fibromyalgia and in its symptoms of pain and panic: progress test in the treatment of a 48 fibromyalgic man with the Biomechanic Anthropometric Ergonomic Method B.A.E. for 18 months, University of Ruse "Angel Kanchev", 2019

FRI-ONLINE-HP-12

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## INNOVATIVE APPROACH IN THE STUDY OF MUSCLE STRENGTH - THEORETICAL BASIS

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**Abstract:** *The assessment of a patient's muscle strength is one of the most important vital functions that is typically monitored. Specifically, strength assessment is necessary for determining distribution of weakness, disease progression, and/ or treatment efficacy. Several assessment techniques and tools are currently available to the healthcare provider and/or researcher, yet each has its unique attributes. Nevertheless, as outcomes-based medical practice becomes the norm, the need for quantitative outcomes assessment of muscle strength will become even more important. Standardized strength-testing procedures are important regardless of whether MMT or HHD are used. MMT is simple, easy to use, and therefore clinically practical. However, the reliability and responsiveness of MMT is uncertain for strength greater than 3/5. HHDs potentially quantify strength numerically by recording force output. Because of the portability of HHDs, they are useful in the clinical/bedside environments for tracking strength changes.*

**Keywords:** *muscle testing, muscle strength, measurement of muscle strength, dynamometers, hand-held dynamometry, HHD, MMT*

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## **FRI-ONLINE-1-HC**

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### **EFFECTS OF SARS-COV-2 ON THE REPRODUCTIVE SYSTEM**

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**Abstract:** The pandemic spread of COVID-19 in the last two years has become a challenge to the achievements of medicine, the pharmaceutical industry and social life worldwide. This review report aims to cover data from recent studies on how the SARS-CoV-2 affects the human reproductive system. The registered deviations in the hormonal production and spermatogenesis in males are covered in details. An interesting pattern observed in men with hyperandrogenic alopecia called Gabrin sign. However, the real challenge turned out to be women's reproductive health, as the protective function of estrogen is known. Research is also aimed at potential vertical transmission of the virus during pregnancy. As an important section, as well as a message to the audience, special attention is paid to the safety of vaccines, as the reported facts are supported by recommendations of the professional organizations in the field. A parallel has been made between the consequences of antibody formation both after infection and post-vaccination.

**Keywords:** Infertility, COVID-19, Reproduction, ART and Vaccine.

**JEL Codes:** I 1

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## INNOVATIVE TECHNOLOGIES IN TRAINING OF HEALTH CARE IN BULGARIA

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**Abstract:** *The report discusses the inclusion of serious educational games in the educational process of Health Care in higher education institutions in Bulgarian in recent years. A definition of health according to the World Health Organization is presented. The provision of competent health care for the population, the attention of patients at all stages of the development of their diseases and the formation of healthy habits in people are fundamental in actions to preserve human health. The main disadvantages of traditional education and the possibility of serious games to be used to improve the quality of health care education, building a new vision of university education are presented. The main components that are taken into account when creating serious games are presented: game content, game technology and development tools. The main elements of the training games are indicated, which are key for supporting the training in the field of health care. The report also presents a specially created serious game, focused on the mastering of the injection technique of the students of Health Care at the University of Ruse.*

**Keywords:** *quality of education, health education, serious educational games.*

**JEL Codes:** L10, L11

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## CONTEMPORARY MIDWIFE CARE FOR WOMEN'S PELVIC FLOOR HEALTH

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**Abstract:** Pelvic floor health is key to the quality of life for women. Various research papers outline the influence pelvic floor disease has on women's lives and day to day activities. With this work we are describing contemporary approaches towards pelvic floor health, focusing on shedding light on some more unpopular options in Bulgaria. In the second segment of our research, we present data from a small local survey, which aims to showcase women's views on the level of information and care they have access to regarding pelvic floor health. The purpose of this study was to assess whether women actually have access to healthcare that addresses these problems. We also outline some necessary steps to upgrade practices and optimise Bulgarian Women's health in this regard.

**Keywords:** Pelvic floor health, Pelvic floor care, Neuromuscular electrical stimulation, NMES, Pelvic floor muscles, Descensus uteri, Genital prolapse, Urinary incontinence, Pelvic floor exercise, Kegels.

**JEL Codes:** I 18

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## CRISIS IN THE HEALTHCARE SYSTEM RELATED TO THE LACK OF NURSES IN THE REPUBLIC OF BULGARIA

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**Abstract:** What are the causes of the staffing crisis related to the shortage of nurses? Why is this noble, necessary, guaranteed realization less and less attractive to young people? Against the background of the growing need for nurses worldwide, there is a significant outflow of the profession, especially visible in Bulgaria.

The purpose of this report is to present the factors and reasons why the nursing profession is less and less preferred by young people, as well as the proposed measures aimed at employers to overcome the personnel crisis. The foreign experience and anti-crisis strategies are analyzed, the results of research on the professional attitudes of the students majoring in Nursing from the University of Ruse "Angel Kanchev" are presented. The position of the Bulgarian Association of Healthcare Professionals (BAPZG) is presented. The conclusions are aimed at uniting the efforts of all stakeholders to build a long-term comprehensive anti-crisis strategy with real actions aimed at raising the prestige and importance of the profession, improving working conditions and adequate remuneration of nurses.

**Keywords:** nurse, personnel crisis, factors, anti-crisis strategy.

**JEL Codes:** I 18

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FRI-ONLINE-1-HC-05

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## HOSPICE/PALLIATIVE CARE IN BULGARIA - NEED, QUALITY AND INTEGRATION

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**Abstract:** *The need of affordable high-quality hospice/palliative care in Bulgaria is undeniable, but neglected. The purpose of this study is to establish the users' opinion about the quality and the need of hospice/palliative care, to indicate the satisfaction of the services and to support the integration of hospices in the healthcare system. Patients and their families were involved in this study. The opinion of the participants is presented with a questionnaire survey. The overall results indicate that the patients and their families are satisfied with the care provided. The key elements and essential needs for integration of hospice/palliative care in the healthcare system are identified..*

**Keywords:** hospice/palliative care, quality, satisfaction, results, integration.

**JEL Codes:** I 18

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## MENTAL HEALTH IN A PANDEMIC PERIOD

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**Abstract:** *The current pandemic situation manifests in increased anxiety, stricter restrictions and refusal to communicate with relatives and friends. In recent months, it has become clear that the global situation will not be resolved within a few months or a year, and this has led to pessimism and feelings of depression. Additional health problems such as stress, anxiety, depressive symptoms, insomnia, denial, anger, and fear appear worldwide.*

*The aim of the study is to examine patients' perceptions of their concerns during a pandemic. It was conducted in the period June-July 2021 in the practice of GP among 138 patients through a survey.*

*The negative consequences, accompanied by resistance to the imposed measures, may lead to a prolongation of the emergency situation with an increase in all negative health consequences.*

**Keywords:** *pandemic, anxiety, restrictions.*

**JEL Codes:** *I 18*

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## DEPENDENCE ON PSYCHOACTIVE SUBSTANCES AND PREGNANCY

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**Abstract:** *Addiction to psychoactive substances is a chronic disease of the brain. Drug use among pregnant women has increased significantly. During pregnancy and the postpartum period, special care is needed for opioid-dependent women to ensure proper management of withdrawal pain, to prevent recurrence after childbirth and the risk of overdose. Treatment is best offered through a comprehensive treatment program designed to effectively administer maintenance treatment with opioid agonists, along with psychosocial and obstetric care. Methadone during pregnancy reduces the risk of infectious comorbidities with illicit opiate use. The choice of medication for each addicted patient is made taking into account the history of opioid dependence, previous and current treatment experience, medical circumstances and treatment preferences. Treatment during pregnancy and childbirth optimizes health outcomes not for one but for two patients. Pregnancy is a stage in the life of great physiological adaptations, as well as emotional and social changes.*

**Keywords:** drug addiction, addiction, drugs, methadone, pregnancy, complex treatment.

**JEL Codes:** I 18

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## MUSIC THERAPY AND PREMATURE BABIES

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**Abstract:** Music is one of the most powerful means of self-expression. Through it we communicate using another language - the language of our emotions. Music was born in antiquity as a means of healing and harmonizing the soul. It is one of the first healing methods. The Chinese character for music and medicine 4,000 years ago is the same. Music is a force that can influence both positively and negatively - this is true of any healing art. It is good to carefully choose the music that is listened to during pregnancy, because it leaves a deep mark and programs the future life. Ultrasound observations show which music makes babies happy - calm, smooth music that brings beautiful ideas and musical forms. And vice versa - loud music with drums (pop, rock, metal) scares the baby, it reacts as aggression. Some types of classical music are most preferred by babies. It is important what idea, what message, what emotions the music carries.

**Keywords:** Music therapy, premature babies, newborn, pregnancy, premature birth, incubator, neonatology.

**JEL Codes:** L10, L11

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## NUTRITION AND PREGNANCY

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**Abstract:** In recent years, in the training of specialists from the professional department "Health care" specialty Midwife is increasingly talked about the regime of pregnant women and proper intake of a variety of foods without the risk of obesity. A number of factors determine the specificities of lifestyle during pregnancy – physical distinctness, social environment, binge and sleep, work and professional activity, psycho climate and last but not least diet. The midwife is leading the way in advising on the diet and can assess the need for dietary supplements during pregnancy. This allows her to assess the risk of obesity and apply preventive dietary measures if necessary tailored to the needs of the particular pregnant woman and the duration of the pregnancy.

**Keywords:** pregnancy, nutrition, diets.

**JEL Codes:** I10, J13

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## TOXIC LEADERS - CHARACTERISTICS AND EFFECT ON SUBORDINATES IN HEALTHCARE ORGANIZATIONS

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**Abstract:** Leadership is the ability to influence other people. It is a process of influencing individuals or groups to achieve certain goals in a given situation. The leader enables people to work more effectively together in a state of interdependence. Toxic leadership as a form of ineffective leadership can be observed at all levels and in different organizations. Toxic leaders have characteristics such as: unfair treatment, narcissism, unethical behavior, intimidation and aggression. They show low concern for the staff, do not allow the expression of personal opinion and interference in decision-making. All actions are aimed solely at their own growth, without caring about the consequences for other team members and the effect as a whole. Numerous studies show the negative consequences of inefficient management. In the field of health care, toxic leadership is associated with negative consequences for both nurses and patients.

**Keywords:** clinical practice; nurse managers; nursing; quality of care; toxic leadership.

**JEL Codes:** J 28, J53

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## FORMATION OF SOCIAL SKILLS IN THE DIGITAL ENVIRONMENT FOR HEALTH CARE SPECIALISTS

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**Abstract:** In the advanced standards for quality of the training of the health care specialists, along with the knowledge and skills, the formation of competencies - abilities and values for effective professional, personal and social realization takes place. Among the socially significant qualities are communication and companionship, teamwork, motivation to learn, self-control, moral and ethical characteristics such as empathy, compassion, kindness, confidentiality and others. The wide range of abilities that become the key to future successful professional realization, sociologists and psychologists introduce the term "emotional intelligence". The establishment of social skills takes place under the influence of a wide range of socializing factors. At the university, this is the mission and responsibility of health care teachers. The passing of education in digital environment is a huge challenge for teachers in the Health Care field. They have to convey digitally social interactions to the students they trained and form the necessary characteristics.

**Keywords:** social competencies, emotional intelligence, health care professionals, digital teaching.

**JEL Codes:** I23

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## DESIGN OF HEMODIALYSIS PATIENT TRAINING

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**Abstract:** Hemodialysis patients are specific subjects of the learning process and require special and individual attention. Design is the means by which the learning objectives are achieved in a unique way and the process itself looks much more attractive. This is an approach that contributes to the acquisition of experience by each participant. When applying training design, the material to be mastered is adapted to the specific needs of hemodialysis patients. The devices used are specially designed according to the needs of hemodialysis patients, taking into account the development of health care, the needs of service users and the knowledge and skills they need to acquire. Case study shows the relationship between specific knowledge and its benefits. Through this method, training has meaning and significance for the formation of practical skills. Specific, accurate, clear and well-founded situations are described. This approach helps to adapt faster and get used to the new situation. The design of the training also implies greater activity on the part of the participants. What they learn gives them the opportunity to live and feel good, despite the illness they have and the procedures they have to perform during the day.

**Keywords:** Design, Training, Hemodialysis, Patient.

**JEL Codes:** I21

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FRI-ONLINE-1-HC-13

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## WATER BIRTH, MODERN TREND OR NOVELTY IN OBSTETRICS THROUGH THE EYES OF STUDENTS FROM THE UNIVERSITY OF RUSE ANGEL KANCHEV

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**Abstract:** Water birth is one of the greatest innovations in the birth of our time and can no longer be considered a passing fad. Water birth refers to immersion in water by a pregnant woman during each stage of labor (first, second, third), where the woman's abdomen is completely immersed in a vessel that may be called a pool or bath. Evidence shows that hydrotherapy and water birth are gaining popularity internationally and are emerging as a means of non-pharmacological analgesia during childbirth, facilitating the birth process by providing a sense of control over the birth process in women, reducing pain perception and eliminating unnecessary interventions. Water births have gradually become increasingly popular in industrialized countries over the last decade. People advocating this form of childbirth claim that immersion in water helps the mother to relax and that heat helps reduce pain, which means that the whole work process and experience are positively affected and even accelerated.

This is an important context due to the increasing frequency of cesarean sections globally and the lower smuggling of natural childbirth. The activity related to water birth itself promotes its natural course, creates interaction between the woman and her midwife, improves the approach to care, optimizes the physiological act and reduces the likelihood of obstetric intervention, which is consistent with evidence of continuous support during childbirth. This element carries in itself the realization of a "happy birth" and influencing the emotional well-being of the newborn and the mother.

**Keywords:** water birth, midwife students, hydrotherapy during childbirth, alternative methods during childbirth, natural birth.

**JEL Codes:** I21

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FRI-ONLINE-1-HC-14

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## FETAL ALCOHOL SYNDROME AS A CONSEQUENCE OF ALCOHOLISM DURING PREGNANCY

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**Abstract:** Compared to men, the risk of alcohol use by women has a disproportionate effect on their health and life, including reproductive function and pregnancy outcomes. For pregnant women and those at risk of pregnancy, it is important for the obstetrician-gynecologist to give convincing and clear advice on how to avoid alcohol use, provide help to achieve abstinence, or provide effective contraception to women who need help. The harmful effects of alcohol on offspring have been mentioned for centuries, although only in the last few decades has the link between alcohol and birth defects been conclusively proven. Alcohol is teratogenic. In the spectrum of adverse effects on the fetus or baby associated with maternal drinking during pregnancy, the most dramatic is fetal alcohol syndrome, a pattern of malformation that is associated with maternal alcohol abuse. The cost of fetal harm associated with alcohol exposure is very high. It is therefore a necessary program to reduce the incidence of fetal alcohol effects. However, the diagnosis remains challenging due to the poor reliability of self-reported maternal drinking histories, the lack of sensitive biomarkers, and the rarity of diagnostic dysmorphic facial features among individuals with fetal alcohol spectrum disorder. Different diagnostic systems and differences in criteria slow down progress in diagnosing and managing the disorder. The severity of fetal alcohol syndrome can be determined during the first three years of life based on an assessment system. Familiarity with fetal alcohol syndrome and the ability to recognize its clinical features are important for the adequate treatment and support of the affected child and for the mother suffering from alcoholism, in collaboration with other physicians. In general, the advice of non-pregnant women who drink less alcohol is strongly supported by the epidemiological literature, although specific recommendations for a particular woman should depend on her medical history and risk factors.

**Keywords:** alcohol dependence, alcohol, pregnancy control, congenital anomalies.

**JEL Codes:** I11

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FRI-ONLINE-1-HC-15

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## AWARENESS OF RECOMBINANT VACCINES AND SELECTION OF VACCINE AGAINST SARS-COV-2 VIRUS

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**Abstract:** Vaccines protect against infectious diseases that spread rapidly, have an epidemic course, could lead to severe complications, permanent damage or lethality. No 100% effective vaccines are currently known, nor are 100% effective drugs known. The effectiveness of a vaccine is determined by its ability to prevent the disease against which it has been developed.

Two centuries have passed since the creation of the first vaccine. Through WHO and individual vaccination programs, the severity of some infectious diseases and their epidemic are limited to a small number of infectious diseases globally. The emergence of various vaccines is closely linked to scientific and technological progress and the adoption of new technologies. In the conditions of the COVID-19 pandemic, pharmaceutical companies have focused on the development and production of recombinant vaccines using mRNA technology and based on the SARS-CoV-2 virus vector.

COVID-19 is an emerging infection that occurs epidemiologically and on March 11, 2020, the World Health Organization declared a pandemic. Part of the medical anti-epidemic activities imposed by the European Commission and the WHO was the voluntary vaccination.

The purpose of this report is to set out the preferences of the people to be vaccinated regarding the type of vaccine, through a survey in the period January-May 2021 in the district of Ruse.

**Keywords:** Infectious disease, COVID-19, vaccine prophylaxis.

**JEL Codes:** I11

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FRI-ONLINE-1-HC-16

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## MEDICAL AND LEGAL ASPECTS OF SUPPORTED DECISION-MAKING

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**Abstract:** The paper reviews the various aspects of supported decision-making. The idea to introduce support measures in the Bulgarian legislation needs serious research and consideration. In the proposed draft of Law on Individuals and Support Measures envisages a new regulation of legal capacity and introduces supported decision-making. The range of legal actions which people with mental disabilities can perform is maximally expanded, and legal provisions are established for increasing their ability to make independent decisions. The capacity of people with mental disabilities is assessed only in relation to a specific issue that arose at the relevant time. The hypothesis is that the legal capacity can be changed in certain cases by analogy with the sanity, which is determined for any specific illegal act.

**Keywords:** supported decision-making mental disabilities sanity,

**JEL Codes:** I 140, K140

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**FRI-ONLINE-MCDA**

**FRI-ONLINE-MCDA-01**

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**FREQUENCY OF EPIDERMAL GROWTH FACTOR RECEPTOR  
TARGET MUTATIONS IN LUNG CANCER PATIENTS**

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**Abstract:** Background: Epidermal growth factor receptor (EGFR) gene mutations are observed in lung carcinomas (LCs) and are connected with target therapy. The aim of the study is to determine the frequency of different EGFR gene mutations in LCs in Bulgarian patients. Methods In this study 1427 NSCLC samples were included. DNA was extracted from either formalin-fixed paraffin embedded (FFPE) tissues or cytology specimens and analyzed for the presence of 29 recurrent EGFR gene mutations using SARMS PCR. Results: 127 samples (8.9 %) were found to be positive for activating mutations in the EGFR gene. In 26/1427 (1.8 %) samples a T790M point mutation in exon 20 (associated with tyrosine kinase inhibition resistance) was detected, in none of the cases in combination with other (activating) EGFR gene mutations. The overall EGFR gene mutation frequency (including T790M) was 10.7 % (153/1427). In conclusion our data show the frequency of EGFR gene mutations in lung carcinomas in the East European cohort.

**Keywords:** Epidermal growth factor receptor, Mutations, ARMS-PCR

**JEL Codes:** L 10, L 13

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## POINT OF CARE TESTS IN CLINICAL LABORATORY

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**Abstract:** *Point-of-care testing (POCT) is for the rapid detection of analytes near to the patient, which facilitates better disease diagnosis, monitoring, and management. In the early days of medicine, few medical tests existed that were done at the patient's bedside. By the 1950s, automated technologies meant centralized clinical laboratories could run large numbers of tests at low cost. It became common to send samples away to laboratories and then wait days to weeks for results. Point-of-care testing spans so many areas of medicine that it is best defined by where it's done – anywhere outside the centralized laboratory – rather than by the kinds of tests that are performed. In general, point-of-care testing encompasses any tests that are performed at or near a patient and at the site where care or treatment is provided. Results are typically available relatively quickly so that they can be acted upon without delay. And a wide variety of people can perform point-of-care tests, including laboratory professionals, emergency first responders, doctors, nurses, physician assistants, or other healthcare practitioners. They may even be done by yourself, sometimes called “self-tests” or “home tests.”*

**Keywords:** clinical laboratory, centralized laboratory, point-of-care testing, diagnosis, monitoring

**JEL Codes:** L 10, L 13

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## HEALTH PROBLEMS OF FUTURE HEALTH CARE PROFESSIONALS IN THE CONDITIONS OF ONLINE - TRAINING

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**Abstract:** The success of the educational process in higher education largely depends on the health of students - health care professionals. The higher school has the important social task to prepare specialists, capable of performing quality professional activity and with established virtues, necessary for them to carry out the chosen humane profession.

The scientific communication presents the essence of the concept of health and health problems. The risks of the modern online educational environment for the health condition of the students are analyzed. The measures and actions concerning the prevention and overcoming of the negative problems of the online education on the health of the future health care specialists are considered.

**Keywords:** health problems, future specialists, health care, online training

**JEL Codes:** L10, L13

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## CLINICAL AND ANATOMICAL ASPECTS OF LUMBAR STENOSIS

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**Abstract:** Lumbar spinal stenosis (LSS) is most commonly due to degenerative changes in older individuals. LSS is being more commonly diagnosed and may relate to better access to advanced imaging and to an aging population. This review focuses on radicular symptoms related to degenerative central and lateral stenosis and updates knowledge of LSS pathophysiology, diagnosis and management. Since patients with anatomic LSS can range from asymptomatic to severely disabled, the clinical diagnosis focuses on symptoms and examination findings associated with LSS. Imaging findings are helpful for patients with persistent, bothersome symptoms in whom invasive treatments are being considered. There is limited information from high quality studies about the relative benefits and harms of commonly used treatments. Interpreting and comparing results of available research is limited by a lack of consensus about the definition of LSS. Nevertheless, evidence supports decompressive laminectomy for patients with persistent and bothersome symptoms. Recommendations favor a shared decision making approach due to important trade-offs between alternative therapies and differences among patients in their preferences and values.

**Keywords:** spinal stenosis, lumbar, degenerative changes, spine

**JEL Codes:** L 10, L 13

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## INHALATION TECHNIQUE - FACTOR FOR ADEQUATE INHALATION THERAPY

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**Abstract:** Inhalation therapy is one of the most commonly used methods not only in the treatment of lung infections, but also in the control of bronchial asthma, treatment of attacks. Inhalation devices are diverse, but the basic principle of action is to disperse the drug substance into fine particles that easily reach the end sections of the respiratory system. One of the main advantages of inhalation therapy is the rapid relief of symptoms and control of seizures. Adequate inhalation therapy requires the use of an appropriate inhaler device for each patient and the application of proper technique. It is recommended that inhalation therapy be performed with one type of inhaler device. The basis of adequate inhalation technique is to conduct training of patients and, if necessary, their relatives when prescribing inhalation therapy and before any change in therapy.

**Keywords:** inhaler device, inhalation therapy, inhalation therapy

**JEL Codes:** L 10, L 13

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## HEALTH, DISEASE, HEALTH MANAGEMENT AND ELECTRONIC HEALTH

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**Abstract:** The concepts of health are considered as complete physical, mental or social well-being of the individual, and not only the absence of disease or infirmity. There are four dimensions to health: physical, mental, emotional, social and spiritual health. Attention is paid to health risk factors, health education and culture. The disease is also commented on as a process that goes through several stages. The creation of a new policy in the field of social medicine and health management is defined as a priority task in the strategic development of Bulgarian healthcare and the need for health managers who master new technologies of management and regulation of healthcare processes, prepared for the challenges of the dynamically emerging health services market. The tasks of the health manager and the need for a new e-health for a comprehensive approach to solving health problems and preserving the health of the nation are noted.

**Keywords:** health, disease, health risk factors, e-health

**JEL Codes:** L 10, L 13

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## HEART RATE CONTROL IN THE PREVENTION AND TREATMENT OF CARDIOVASCULAR DISEASES

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**Abstract:** Cardiovascular pathology is one of the leaders amongst diseases affecting the modern man. Cases of arterial hypertension, acute coronary syndrome, and heart failure become more frequent with age. Heart rate control has been proven in the prevention of these diseases while at the same time being an important target in their treatment. In recent years, there is ample evidence that low heart rate, even in young, healthy persons, serves not only as a marker of detraining, but also reduces the risk of heart disease and mortality in the future. It was found that in addition to the baseline heart rate of patients, tracking it over time is also vital. Beta-blockers are long-established drugs for optimal control of heart rate both at rest and during exercise. Their effect is different in the distinct representatives of the group. Their careful titration is important in order to reach the optimal values of 50 to 70 beats / minute, because just like in the control of many other diseases the so-called J-curve is also present here.

**Keywords:** Cardiovascular disease, heart rate, beta blockers, heart failure, acute coronary syndrome

**JEL Codes:** L10, L13

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## TREATMENT OF NEUROPATHIC PAIN ASSOCIATED WITH DISC HERNIATION

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**Abstract:** Spinal diseases are becoming an increasingly important medical, economic and social problem in the modern world. Pain in the three parts of the spine - cervical, thoracic and lumbar in most patients are due to damage to the intervertebral discs owing to degeneration or disc herniation. The pain of a herniated disc is of a mixed nature - nociceptive and neuropathic. Neuropathic pain has different clinical features from nociceptive pain, has a chronic or remittent course, adversely affects all aspects of health and impairs the quality of life of the patients. Along with the adverse health consequences and deteriorating quality of life, untreated neuropathic pain results in high consumption of health and social services, leading to economic burden. Managing neuropathic pain remains a therapeutic challenge due to the diverse clinical picture, complex pathogenetic mechanisms and side effects of the drugs used. International and national consensus have been established for the treatment of neuropathic pain, according to which the drugs of first choice for the treatment of neuropathic pain are antidepressants - tricyclic antidepressants and serotonin and norepinephrine reuptake inhibitors, as well as anticonvulsants - voltage gated calcium channel blockers. The treatment of neuropathic pain is performed by a neurologist, it is symptom-oriented and lasts for at least six months, and there must be an individual approach to individual patients in connection with their concomitant diseases and the possibility of side effects of medications.

**Key words:** Disc herniation, Neuropathic pain, Antidepressants, Anticonvulsants

**JEL Codes:** L 10, L 13

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## THE ROLE OF HYALURONIC ACID IN CANCER PATIENTS LITERATURE REVIEW

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**Abstract:** Cancer still remains one of the leading causes of death worldwide. Successful cancer treatment is one of the most important goals of current medical science. Hyaluronic acid (HA) is mucopolysaccharide naturally found in humans and is the main constituent of the extracellular matrix. It has a lot of useful advantages. Numerous tumor cells overexpress several receptors that have a high binding affinity for HA. Those receptors are poorly expressed in normal body cells. HA-based drug delivery carriers can offer improved solubility and stability of anticancer drugs in biological environments and allow for the targeting of cancer treatments. Based on these benefits, HA has been widely investigated as a promising material for developing the advanced clinical cancer therapies in various formulations. Administration of HA is a valuable therapeutic method for many patients. Recently numerous formulations containing HA are available. Their systemic administration is effective in many people but in some situations may expose the patient to a greater risk. HA interacts with specific receptors and promotes cell proliferation. This is hazardous in cancer patients, even with a history of that disease, so oral formulations should be contraindicated in that group of patients. HA in stroma and plasma may be a novel prognostic biomarker in breast, ovarian, endometrial, prostate, bladder cancer patients. Several members of HA family of molecules- HA synthases, receptors, hyaluronidases are critical determinants in tumor growth and progression – metastases and angiogenesis

**Keywords:** biomarker, cancer, drug delivery system, hyaluronic acid, progression, therapeutic method

**JEL Codes:** L10, L13

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## PREVENTION OF MELANOMA

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**Abstract:** In modern society, cancer is one of the leading causes of death after cardiovascular disease. The number of patients with malignant diseases worldwide is growing every year. Skin cancer is two types: melanoma and non-melanoma. Cutaneous carcinoma is a disease of the pigment cells of the skin. It is caused mainly by cumulative exposure to ultraviolet radiation (UVR) from the sunlight or tanning lamps and beds but genetic factors are also discussed. Malignant melanoma develops in the melanocytes and is one of the most aggressive and serious type of skin cancer. At about 3,5 million people worldwide, suffer from it. Melanomas typically occur in the skin of back, legs, arms and face, but may rarely occur in the mouth, nose, throat, intestines or eye. It is characterized by aggressive growth and early metastasis. The aim of this article is to acquaint with the risk factors and prevention of cutaneous melanoma. Factors that may increase the risk of melanoma include: fair skin, history of sunburn, excessive UV light exposure, having many unusual moles, a family history of melanoma and weakened immune system. Knowing the warning signs of skin cancer can help ensure that cancerous changes are detected and treated before the cancer has spread. Melanoma can be treated successfully if it is detected early.

**Key words:** malignant melanoma, prevention, risk factors

**JEL Codes:** L 10, L 11

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## BREAST CARCINOMA WITH PREDOMINANTLY SQUAMOUS DIFFERENTIATION – DIAGNOSTIC CHALLENGE. DIFFERENTIAL DIAGNOSIS

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**Abstract:** Primary squamous cell carcinoma of the breast is extremely rare tumor, accounting less than 0,1% of breast malignancies. Characteristically this tumor is composed of neoplastic epithelium with squamous differentiation, it is usually triple negative with high proliferative index. This tumor is very aggressive, has unfavorable prognosis, often presents with large mass and frequently with distant metastasis at time of diagnosis. We report a case of 41-year-old woman who presented with palpable breast mass, later histologically confirmed as primary squamous cell carcinoma of the breast.

**Keywords:** Breast carcinoma, metaplastic, squamous differentiation.

**JEL Codes:** L 10, L 13

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## CASE OF NEUROFIBROMATOSIS TYPE I WITHOUT SKIN MANIFESTATIONS

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**Abstract:** Neurofibromatosis type 1 is an autosomal dominant genetic disease affecting about 1 in every 3000 births. Usually it is presented by skin lesions and in 30% with peripheral nerve tumors. There is a lot of data available regarding the disease, however there is no standardized treatment. In the present case report we present a case of neurofibromatosis type 1 without skin lesions, but with symptomatic peripheral nerve tumors.

**Keywords:** neurofibromatosis type 1, peripheral nerve tumors, neurosurgery

**JEL Codes:** L10, L13

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**THE PROBLEM OF THE PERIODIZATION OF THE HISTORY OF THE  
BULGARIAN STATE AND LAW**

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**Abstract:** *"History of the Bulgarian state and law" is a complex, two-component and inhomogeneous research and teaching discipline in the field of legal sciences. It is this circumstance that creates problems with the periodization scheme, the use of which is inevitable in view of the very long chronological period that the discipline occupies. The periodization of the history of Bulgarian law is related to the periodization of the history of the Bulgarian state, but the two are not the same thing.*

*At the moment, the general, established periodization of the history of the Bulgarian state is used for practical needs. The main criterion used in its construction is political - whether a Bulgarian state existed and what its essence is. At the same time, it is a notorious fact that even in the years of the absence of a Bulgarian state, there is Bulgarian law and this is the common law.*

*The thesis developed in the article is based on three pre-set restrictions.*

*We bring to the fore the circumstance that in the Bulgarian society two layers of law existed in parallel and in interaction - customary and written. Their interaction is manifested both in the exchange of legal institutions and norms, and in the mutual collision with a variable result. Written law appears later; after about the middle of the twentieth century, customary law went into complete decline. The main periodization criterion with regard to written law may be the consecutive, at least four waves of reception of foreign law. If we have to talk about a general periodization of "History of the Bulgarian state and law", it is more reasonable to use the periodization of the history of Bulgarian law for two reasons: first, it is the legal element that determines the specific nature of the discipline as a legal discipline. ; second, to a large extent the history of law absorbs the history of the state.*

*In this sense, I propose the following periodization of the history of Bulgarian law to be used for the needs of the whole discipline.*

*Period of pagan customary law (until the conversion in the ninth century)*

*Period of parallel existence of customary law and written state law, dominated by Byzantine borrowings (IX - XIV century)*

*Period of absence of written state Bulgarian law and limited application of customary law (during the Ottoman rule)*

*Period of domination of written law of the Bulgarian state of continental European type and increasingly narrow application of customary law (until the middle of the twentieth century)*

*Dominance of Soviet-style written law and final abolition of customary law (until 1989)*

*Return to the European legal tradition (especially after 2000) ES.*

**Keywords:** History, Law, State, periodization

## RIGHT OF PROTEST

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**Abstract:** *The right of protest is a collective subjective right exercised to protect collective goods. This right belongs to every legal entity individually, but the purpose of its implementation is a reaction of civil society against the legitimacy of power. The right of protest has been established in the law theory as the right of civil disobedience.*

**Keywords:** *protest, civil disobedience*

**JEL Codes:** *K10*

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**FRI-ONLINE-L-03**

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## **FUNCTION OF THE STATE**

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**Abstract:** *Every state exists to be a means to an end. The specific meaning of the state is to preserve the integrity of society and ensure its development. In order to achieve this, the necessary public relations are established and arranged in the state, they receive organizational expression and are transformed into functions. These are the natural functions of the state. With the natural development of society, new relations, new institutions are established. Thus, along with the natural functions, new ones are formed, which we define as organizational functions.*

**Keywords:** *State, Sovereignty, Function, Organization*

## LAW AS PURPOSEFUL ORDER

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**Abstract:** Law is an instrument of imposing a certain order as a goal. Goals in law are an ideal beginning. They predetermine management decisions, and then the content of legal rules set forth in a normative act. In order to perform its role of a regulator of social relations concerning goods, law exists first in its conceptual being, where goals and means to achieve them are being determined.

The present discourse analyzes the conceptual being of law, and particularly - goal - setting and expediency of the normative regulator, as its basic characteristic.

**Keywords:** law, goal - setting, expediency, ideal being

**JEL Codes:**

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**FRI-ONLINE-L-05**

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**TO THE ISSUE OF DISPUTING THE ACT FOR THE ELECTION OR  
APPOINTMENT OF A MINISTER**

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**Abstract:** *In the latest few months one of the most debated issues in Bulgaria was the work of the former caretaker cabinet appointed by the President of the Republic with Decree No 129 of 10.05.2021 (published in the State Gazette No 39/12.05.2021). Due to the information about the dual citizenship of one of the government ministers the Constitutional court of the Republic of Bulgaria was addressed and the Court is supposed to deliver its decision soon. In the paper the author presents her opinion on the case before the Constitutional court and in general - on the possibility to attack the act for the election or appointment of a minister after the termination of the powers of the Council of Ministers.*

**Keywords:** *Constitutional court, minister, appointment, election, government*

**JEL Codes:** *D 72, H 70*

**FRI-ONLINE-L-06**

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## **ON THE MATTER OF SUBJECTS OF ADMINISTRATIVE LAW**

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**Abstract:** *The paper reviews existing approaches to defining the notion of subjects of Administrative law and the types of these. Attention is paid to the administrative legal personality comprising of capacities feature to every sort of legal subject. New elements in analysis are developed on the matter of EU citizens and enterprises with established seat in a Member State of the European Union as subjects of Administrative law. Then administrative bodies and public entities are reviewed. Finally, the state and territorial communities find their place among the types of Administrative law subjects with necessary comments on commonalities and differences. Author's assumptions and ideas are presented with the aim to provide a due contribution to the Administrative law theory. In the course of analysis legal normative acts are researched in different fields of state governance together with case-law of national administrative courts and jurisdictions and the Court of the EU.*

**Keywords:** *Administrative law, legal subjects, legal personality, individuals, EU citizens, enterprises, legal persons, administrative bodies, public entities, state, territorial communities.*

FRI-ONLINE-L-07

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## PUNISHMENT OF OBVIOUSLY MINOR ADMINISTRATIVE VIOLATIONS AND MINOR ADMINISTRATIVE VIOLATIONS

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**Abstract:** *The paper reviews cases of punishment of obviously minor and minor administrative violations. The administrative violation is an offence of the established order of the state government. It is a public act of danger. The degree of public danger is different in the individual violations. Minor administrative violations and obviously minor administrative violations are acts with very low degree of public danger. This requires a different way of their punishment. This approach will concern the issue of the realization of the administrative-penal responsibility and the procedural order in which this will be done. The paper reviews both current law and the new changes of law about this problem.*

**Keywords:** *Administrative Violation, Administrative Punishment, Minor Administrative Violation*

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**FRI-ONLINE-L-08**

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## **LEGAL SOURCES OF INTERNATIONAL TAX LAW**

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**Abstract:** *The paper reviews the notion of "source of law", its various manifestations, the formal legal sources for regulating tax relations with a cross-border element at national, supranational and international level, their hierarchy and coordination, the place of soft law instruments, trends in the development of sources of law and international tax law in the global world. In the context of the instruments of international and EU law and global policies there is a tendency for more and more decentralized lawmaking. Within the global pluralistic structure characterized by the coexistence and connectedness of many legal and tax systems belonging to different forms and levels of territorial and political community, the state is gradually losing its authority as an independent creator of law and tax rules.*

**Keywords:** *source of law, international tax law, soft law, hard law, coordination, decentralization*

**FRI-ONLINE-L-09**

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## **THE TAX PAYERS' RIGHTS IN CHANGING SOCIETY AND DIGITAL WORLD**

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**Abstract:** *The paper reviews the definition and redefinition of tax payers' rights in this changing society and digital world. It also analyzes how the tax payers' are protected by the rule of law in the way tax laws are formulated, legislated, imposed and administered.*

**Keywords:** *tax law, tax payers' rights, digital,*

**JEL Codes:** *K340, K330*

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**FRI-ONLINE-L-10**

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**FOR THE ESTABLISHMENT OF THE PROPERTY REGISTER IN THE  
REPUBLIC OF BULGARIA**

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***Abstract:** More than 17 years after the adoption of the Law on cadastre and the property register, the property register in the Republic of Bulgaria has not been established. this report addresses some of the issues that prevent the establishment of the register. Legislative changes are proposed in order to overcome them.*

***Keywords:** cadaster, property register*

## ECONOMIC AND NON-PROFIT ACTIVITY OF THE MUNICIPALITY

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**Abstract:** The term "business" is extremely popular. It is used in colloquial language, everyday business practice, in regulations, as well as in other legal documents. Bulgarian legislation does not contain a general definition of economic activity. It is defined by special (private) definitions in the Law on Restriction of Administrative Regulation and Administrative Control over Economic Activity and in the Law on Protection of Competition in view of the specific subject of legal regulation, therefore their meaning should not be absolute. Due to the wide popularity and importance of the term "business", it should be analyzed and clarified.

**Keywords:** economic activity, non-economic activity, municipality, economic activity of the municipality

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## MATTERS OF THE NON-PROFIT ACTIVITY OF THE MUNICIPALITY - ORGANIZATIONAL FORMS FOR IMPLEMENTATION OF NON-PROFIT ACTIVITY

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**Abstract:** Within the meaning of § 1, item 11 of the Additional Provisions of the Public Finance Act, “activities delegated by the state” are the activities for the provision of public services to which the population should have equal access in accordance with current legislation and which are financed in whole or in part from the state budget through the budgets of the municipalities. The legal framework of these activities aims to ensure equal (equal) access to them by the citizens of each municipality. On the other hand, within the meaning of § 1, item 20 of the Additional Provisions of the Public Finance Act, “local activities” are the activities of providing public and other services that municipalities provide on the basis of a law and / or decision of the municipal council and which are not funded as delegated activities. The implementation of local activities that do not have the nature of economic activity can be carried out directly by the municipality, incl. through created non-independent organizationally separate structural units - the so-called “Units” and “activities”. They must be separated from the specialized units of the municipality for the implementation of local activities and services financed by the municipal budget - municipal enterprises, which are established under Article 52, paragraph 2 of the Municipal Property Act for economic activity ( argument of art. 51, para 2, sentence 2 in conjunction with art. 52, para 1 of the Municipal Property Act). As a legal entity, the municipality may participate in non-profit legal entities. It can be a founder or join an already formed non-profit legal entity, both independently (foundation) and together with natural or legal persons (association), incl. with other municipalities. Pursuant to Art. 21, para 1, items 14 and 15 of the Law on Local Self-Government and Local Administration, the municipal council adopts decisions for establishment and termination of municipal foundations and for the management of donated property, as well as for participation of the municipality in associations. of local authorities in the country and abroad, as well as in other non-profit legal entities and appoints the representatives of the municipality in them. The Law on Protection and Development of Culture stipulates that cultural organizations, which according to the form of ownership are state, municipal, private and with mixed participation, carry out activities for the creation, dissemination and protection of cultural values (Art. 3, para 1 and para 2 of the Law for protection and development of the culture).

**Keywords:** activities delegated by the state, local activities, municipal units, municipal activities, specialized units of the municipality, municipal enterprises, non-profit legal entities, associations, foundations, municipal cultural institutes.

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## MATTERS OF THE ECONOMIC ACTIVITY OF THE MUNICIPALITY - MUNICIPAL PUBLIC ENTERPRISES - CONCEPT AND TYPES

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**Abstract:** The Law on Municipal Property in Chapter Six “Economic Activity of the Municipality” regulates the conditions, the order and the ways for carrying out economic activity by the municipality directly through specialized units or through participation in company forms. The commercial companies with municipal participation in the capital, for which the prerequisites under Art. 2, para 1 of the Public Enterprises Act are present, shall be defined as municipal public enterprises. Pursuant to Article 3 of the Public Enterprises Act, the bodies of local self-government and municipal public enterprises shall apply the provisions of Chapters Two, Five, Six and Seven, respectively. The limited application of the Public Enterprises Act to municipal public enterprises aims not to violate the rights of the municipality and the municipal council as a body of local self-government. Legal regulation of the implementation of economic activity by the municipality through participation in company forms is contained in other special regulations - the Water Act, the Forest Act, the Medical Establishments Act and others. The normative acts of the general commercial legislation are applied in a subsidiary manner.

**Keywords:** municipality, economic activity of the municipality, commercial companies with municipal participation in the capital, municipal public enterprises, specialized units of the municipality (municipal enterprises).

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FRI-ONLINE-L-14

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## ECONOMIC ACTIVITY OF NON-PROFIT LEGAL ENTITIES

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**Abstract:** The general legal framework of non-profit legal entities is contained in the Non-profit Legal Entities Act. These are legal entities that are created to assist in achieving certain interests of their members - professional, scientific, cultural, etc., without pursuing business goals. According to the activity they perform and the set goals, they are divided into two types: for carrying out public benefit activity and for carrying out activity for private benefit. Under certain prerequisites, both types of legal entities may carry out economic activity. The subject of this report are issues related to the implementation of business activities by non-profit legal entities - nature, conditions, revenues and profits, etc.

**Keywords:** economic activity, non-profit legal entities, associations and foundations.

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## **ABSOLUTE AND RELATIVE THEORIES ON PROTECTION OF POSSESSION**

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**Abstract:** *The protection of possession has aroused great interest and discussion among scholars in the New Age. Great credit should be given to German scientists, thanks to whom many theories have been developed explaining the need to protect the facts. This study will analyze the two main groups of theories for the protection of possession, which were divided by Rudolf Yering into: absolute and relative.*

**Keywords:** *protection, owner, claim*

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**FRI-ONLINE-L-16**

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## **DEVELOPMENT OF PROPERTY PROTECTION DURING THE MIDDLE AGES**

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**Abstract:** *During the medieval period, the development of the protection of the rulers was carried out on the one hand thanks to the case law, and on the other hand - a huge role was played by the church, which played a dominant role in regulating public relations. Within the framework of canon law, a number of means were developed for the protection of domination, directed against those illegal acts which led to the deprivation of the possessor of the actual power over the things*

**Keywords:** *possession, protection, violation*

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Dozhdev, Dm. Ownership in the civil law system;

Klimanova, D., Protection of property in civil law;

## INHERITANCE OF SHARES – PRACTICAL ISSUES

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**Abstract:** The insufficient legislation regarding the inheritance of shares is the reason for multiple controversies in the theory and practice. The aim of this report is to examine these controversial topics, to analyze the existing views on them and suggest adequate solutions whilst taking into account the acting legislation. Consecutively the topics regarding what the term “share” includes in the cases of inheritance, how to proceed when the heir wishes/doesn’t wish to become a shareholder in the limited liability company and the specifics depending on the capacity of the heir are discussed. In the conclusion several proposals for legislative amendments regarding the topic are made.

**Keywords:** Shares, inheritance, shareholders, heirs, controversies

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FRI-ONLINE-L-18

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## LABOUR LAW ASPECTS OF THE APPRAISAL OF EDUCATIONALISTS

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**Abstract:** Appraisal is the process of assessment of the extent to which the activity of teachers, headmasters and the other educationalists corresponds to their professional profile, the requirements of the positions, as well as the development strategy of the kindergarten, school or personality development support centre and, in the case of headmasters, their managerial competence. As well as for career development, the assessment result may be used for referral to improvement of qualifications and for incentivizing the appraised educationalist. In certain cases the lowest assessment is awarded, the person shall be dismissed under Article 328(1)(5) of the Labour Code.

**Keywords:** appraisal of teachers, career development of educationalists

**JEL Codes:** K31

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## HISTORICAL DEVELOPMENT OF THE LEGAL FRAMEWORK FOR PAID ANNUAL LEAVE

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**Abstract:** The right to leave is guaranteed by the Constitution of the Republic of Bulgaria. Paid annual leave is the most comprehensive of the leave types. The article presents a historical overview of the legal framework for paid annual leave, the constitutional foundations of paid annual leave as well as the legislation which was previously in force. The historical retrospective of legislation makes it possible to analyze the development of the term paid annual leave.

**Keywords:** paid annual leave

**JEL Codes:** K31

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## **SHIP MORTGAGE**

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**Abstract:** Chapter Three, "Real Rights and Privileges", Section One, "Transfer and Mortgage of Ships" of the Merchant Shipping Code (MSC), contains the regulatory requirements for establishing a mortgage on a ship. With the latest amendments to the Code (SG, issue 85 of 2010) the regulation has changed significantly. This report examines the requirements for mortgaging a ship, the rights of the mortgagee, the obligations of the mortgagor, and analyzes the case law. It is pointed out that the regulation of the MSC in a number of directions differs from the rules of the Obligations and Contracts Act, both with regard to the requirements for the form of the transaction and with regard to the term of validity and the object of the mortgage.

**Keywords:** ship mortgage, mortgagee, mortgagor.

FRI-ONLINE-L-21

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## THE AMNESTY UNDER BULGARIAN CRIMINAL LAW

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**Abstract:** *The present work aims to present a brief analysis of the Amnesty under Bulgarian criminal law. The Amnesty is a classic criminal law institute whose existence is confirmed and regulated not only in our Penal Code, but also in the Bulgarian Constitution. The reading of the legal norms dedicated to the Amnesty raises certain questions of both conceptual and technical nature and imposes at the same time the conclusion about the necessity of their accurate and coherent analysis*

**Keywords:** *Amnesty, Criminal law, Penal Code, Constitution*

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**EDUCATION AS A STATE-RUN SYSTEM**

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**Abstract:** The report examines the place, role and meaning of the state's education system as a key element of its security. The role and place of different types of education for the sustainable development of the state and the tools at its disposal to manage the process of formation of future citizens and professionals are analyzed, giving recommendations for optimizing this process, as key to maintaining positive prospects for the development of society.

**Keywords:** state, system, government, security, education

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## **INTERNAL SECURITY OF THE STATE**

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**Abstract:** *The report examines the problems with the scientific definition and application in practice of one of the main elements of national security. The internal security of the state as a social phenomenon and the related structures and processes related to the development of a balanced security policy are analyzed, the building of the rule of law and the welfare state, the functioning of the power vertical in accordance with the interests of citizens and regions. The problem related to the creation of a state ideology that will define the vector for the development of society in the future is also studied.*

**Keywords:** *state, security, ideology, interests, politics, society, strategy.*

## THE FOREIGN POLICY ROLE OF THE STATE (BETWEEN "AGING" AND "RESTORING" SOVEREIGNTY)

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**Abstract:** According to many authors, the current era is associated with the terms "postrealism" and "postpositivism". Historically, international relations have been viewed through the prism of the state. Such an approach dominated the second half of the twentieth century. Despite all attempts to become "eternal truth" realism is related to a specific historical context. As writes J. Jung "The tradition of realism in international relations, its principles and orientations can be fully understood only by being placed in the time context when they were formed. This is the time of the collapse of hopes for international peace through the use of the League of Nations". The Cold War is a time of consolidation of realism. D. Rosenau, for example, proposes to replace "international relations" with the term "post-international politics".

**Keywords:** realism, The Cold War, postrealism, postpositivism

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## GLOBALIZATION OF CONTEMPORARY INTERNATIONAL POLITICAL PROCESSES

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**Abstract:** *The main result of total globalization was such a new international political situation on the world stage, which presupposes the interdependence of all countries on the planet and an entirely new paradigm of worldview.*

*The latter is aimed at a profound change in social relations and social institutions in space and time in such a way that, on the one hand, people's daily activities are increasingly influenced by events happening in other parts of the world, and on the other, the actions of many local structures can have important global consequences.*

*The comprehensive description of the current state of globalization has gradually led to the introduction of the term "global civil society" in scientific circulation and diplomatic correspondence between ruling circles and the great powers.*

**Keywords:** *globalization, global civil society, the global economy, internationalization*

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## EFFICIENCY AND EFFECTIVENESS OF APPLICATION OF SPECIAL SEISMIC PROTECTION METHODS

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**Abstract:** *The report examines the existing concepts in the state theory about the nature of the state territory, state borders, territorial supremacy. Proceeding from the established notion that as a legal entity the state represents a territorial community, the connection between the state power and the territory is traced, as well the connection between territorial supremacy and state sovereignty. The hypotheses under which it is possible to limit the territorial supremacy are analyzed. The theoretical summaries made lead to the question of the legal meaning and political consequences of the so -called "transfer of sovereignty" as well the meaning of state borders in the context of globalization.*

**Keywords:** state territory, state borders, territorial supremacy sovereignty

**JEL Codes:**

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**FRI-ONLINE-NS-06**

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## **ON THE ISSUE OF THE PURPOSES OF THE PUNISHMENT IN THE BULGARIAN PENAL CODE**

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**Abstract:** *The report analyses the purposes of the punishment, explicitly stated in the Bulgarian Penal Code. The report points out the leading theories, determining the punishment's goals that have arisen over the years. The main purpose of the report is to clarify why these are the precise goals, proceeding from the mechanism of individual criminal behaviour. This gives prominence to the importance of the punishment for regulating human behaviour.*

**Keywords:** *criminal behavior, purposes of the punishment, functions of the punishment, personal prevention, general prevention*

**FRI-ONLINE-NS-07**

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## **CHARACTERISTICS OF THE PERSONAL PREVENTION OF THE PUNISHMENT**

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**Abstract:** *The report reviews in detail the personal prevention as one of the goals of the punishment, which are regulated in the Bulgarian Penal Code. The report clarifies its greater importance in relation to the general prevention. The view presented in the criminal law theories reduces the purposes of the punishment solely to the personal prevention, and by means of narrow interpretation of the penal legislature further reduces its content. The report argues in favour of the existing legislature by presenting a number of arguments supporting the regulation.*

**Keywords:** *Crime, punishment, purposes of the punishment, personal prevention, general prevention.*

**FRI-ONLINE-NS-08**

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## **SPECIFICATIONS OF THE COMPLEX JUDICIAL EXAMINATIONS IN CRIMINAL PROCEEDINGS**

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***Abstract:** This presentation covers the hypotheses under which for the needs of criminal proceedings it is necessary to appoint forensic experts or specialists with deep knowledge in various fields but particularly in that of complex forensic examinations.*

***Keywords:** forensic examinations, experts, investigation, criminal proceedings, special knowledge*

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## CONTEMPORARY STATE OF THE ORGANISATION OF PRESCHOOL EDUCATION IN ENGLAND

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**Abstract:** *The article presents the main aspects and challenges for the preparation of forensic psychological expert assessment of persons diagnosed with Bipolar Affective Disorder. Bipolar affective disorder is a recurrent chronic disorder that is characterized by fluctuations in mood and energy. It affects more than 1% of the world's population, regardless of nationality, ethnic origin or socio-economic status. This specific disorder is one of the main causes of impairment in the bio-psycho-social functioning of persons suffering from this diagnosis and their relatives. Differentiation of this disorder is difficult in clinical practice, as the onset is most often a depressive episode and there are sufficient clinical markers of unipolar depression. People with bipolar disorder are often misdiagnosed on initial presentation, most often with major depressive disorder. These patients may receive ineffective treatment, which in some cases actually worsens the outcome, either by causing manic or mixed conditions, or by raising mood. Accurate clinical evaluation by clinical and forensic specialists - psychiatrists and psychologists - must be exact in order to be able to distinguish bipolar disorder from other depressive states in order to prepare a forensic psychological examination.*

**Keywords:** *affective disorders, mania, depression, clinical psychodiagnostics*

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## MORE ABOUT THE CENTRAL ROLE OF COURT PROCEEDINGS IN THE BULGARIAN CRIMINAL PROCESS

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**Abstract:** In the Bulgarian theory of criminal procedure, the issue of the central role of court proceedings has emerged as relevant. Firstly, therefore, the lack of a more objective and in-depth study of it testifies. Secondly, it must be said that where it is concerned, this is insofar as it expresses different views on the structuring and movement of the process. Thirdly, in practice there is an unjustified tendency to confuse the role of the court as a subject with the court proceedings themselves as a judicial element. With all this, however, it is not possible to reach the essence of the question and to answer whether the central role of the court proceedings is a normative requirement or a principle of the criminal process. For this reason, with this report is made an attempt to check theoretically the possibility regulated in Art. 7 of the Bulgarian Criminal Procedure Code to be raised in an independent principle of the Bulgarian criminal process. To achieve this goal, a critical analysis has been made for the compatibility of the envisaged situation, both with some of the main principles of the criminal process and with its tasks, including those institutions that shape its modern democratic image.

**Keywords:** criminal proceedings, central role of court proceedings, right of defense, accused, independent arbitrator, objective truth

**JEL Codes:** K410, K420

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FRI-ONLINE-NS-11

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## **THE IMPACT OF THE LOCKDOWN OF KOVID 19 ON CRIMES RELATED TO DOMESTIC VIOLENCE IN THE TERRITORY OF RUSE**

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**Abstract:** *The criminogenic situation on the territory of Ruse region is analyzed in this article, in an attempt to show how the situation with lockdown from Kovid 19 has affected the crimes related to domestic violence. The report is based on statistical data and reports of the regional directorate of the Ministry of Interior Ruse, non-governmental organizations working on the problem and the media for the period March-May 2020, which compare with data for the period 2015-2019 and the same period in 2021. The aim is to give a brief explanation of the recent events after Kovid 19, as well as to explain where the world is in terms of safety. Therefore, the focus of this work was to analyze and point out the changes in the levels of security in Bulgaria and how this may affect in the future, whether in a positive or negative sense.*

**Keywords:** *Covid 19, criminogenic situation, lockdown, domestic violence, victimization.*

## **THURS-ONLINE-1-QHE**

### **THURS-ONLINE-1-QHE-01**

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## **CHALLENGES FOR UNIVERSITIES IN THE CONDITIONS OF ONLINE TRAINING IN COVID PANDEMIC**

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**Abstract:** *The lack of readiness to adapt to work in the conditions of online learning during the covid pandemic leads to a number of psychological problems for both students and teachers, which undoubtedly worsens the quality of the learning process.*

*The facts about mental health are particularly worrying and pose new challenges for universities.*

*There are problems in the online learning process itself, as well as those caused by the new way of life.*

*The role of universities is to help students understand and meet expected standards of behavior or engagement by taking proactive and preventative measures. Finding ways to strengthen students' mental and physical health in the new environment will help develop self-regulation skills - the ability to manage progress towards goals - faster and earlier in life than usual.*

**Keywords:** *learning during the covid pandemic, mental and physical health, role of universities*

**JEL Codes:** *I23*

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**THURS-ONLINE-1-QHE-02**

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## **PARTICIPATION OF THE UNIVERSITIES IN INTERNATIONAL RATING SYSTEM: AN EVITABLE NEED OR CHALLENGE**

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**Abstract:** *The paper examines and discussed the challenges faced by the University of Ruse in terms of its participation in U-Multirank international rating system. The independent rating and evaluations have been considered as an opportunity for the University to be represented in the European Education Area, as well as ground for self-improvements. The comparability based on the rating ensures the development of competition policy and quality management systems. The participation of the university in recent years is commented in terms of global trends of modernization of higher education, internationalization of higher education, and integrity of the educational area an open science perspective.*

**Keywords:** *international rating system, U-Multirank, quality of education*

**JEL codes:** *I20, I21, I23*

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THURS-ONLINE-1-QHE-03

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## THE ROLE OF INTERINSTITUTIONAL COOPERATION FOR THE QUALITY OF STEM-ORIENTED HIGHER EDUCATION

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**Abstract:** *The paper proposes a short literature overview of the development of STEM education in the European Union and its most important strategic framework to illustrate the role of interinstitutional collaboration in providing high-quality education, aiming to motivate young people to choose dynamically changing careers dependent on worldwide trends in innovations and technologies. The opportunity for establishing and developing a model of knowledge transfer and skills acquisitions in higher education on the ground of intra- and inter-institutional key actors e.g. multidisciplinary universities, Excellence centers, as well as technological business entities and secondary schools, is considered of highest importance for the quality of education. The role of the linkage and knowledge-based transfers between the researchers, working in excellence centers, the secondary schools’ teachers, and the university lecturers is also highlighted considering the experience of Ruse University.*

**Keywords:** STEM, interinstitutional coopreration, quality of education

**JEL codes:** I20, I21, I23

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THURS-ONLINE-1-QHE-04

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## RELATIONSHIP BETWEEN “SOFT SKILLS” AND THE ROLE OF THE CAREER DEVELOPMENT CENTER FOR SUCCESSFUL APPLICATION OF STUDENTS FOR WORK

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**Abstract:** The paper reviews “portable skills”, also known as “soft skills” have become hugely popular recently. More and more employers in various fields are of the opinion that they are now just as important as technical skills and even more important. Soft skills are all those things that a person builds over time through his communication with others, and which are applicable in any professional field. They are more difficult to measure than technical skills, but are useful and sought after in any profession.

**Keywords:** “Portable skills”, “Soft skills”, Role of the Center for Career Development in Building Soft Skills.

**JEL Codes:** I21

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THURS-ONLINE-1-QHE-05

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## SERVICES AND POLICIES FOR THE USERS OF RUSE UNIVERSITY COMPUTER NETWORK

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**Abstract:** The paper presents the range of services supported by Computing Center at Ruse University. A brief description of each service is given along to its advantage of use. Main policies and approaches of working with different user groups in the university computer network are commented. Special attention is given to those services and approaches which secure the stability of critical data bases and user's information in case of unexpected collapse of devices or systems in the network.

**Keywords:** University Computing Centre, Information Service, Computer network services, Antispam defence, Antivirus defence.

**JELCodes:** I23

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## CONCEPT FOR A UNIFIED ELECTRONIC INFORMATION SYSTEM FOR PROCESSING AND STORING THE EXCHANGE OF INFORMATION RESOURCES AT THE UNIVERSITY LEVEL

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**Abstract:** As a result of the intensified development of communication and computer technologies, the flow of information concerning higher education institutions has increased many times in recent years. The concept of developing information systems to solve a specific problem no longer works. The report analyzes the current state of the information systems applied at the University of Ruse. Due to the presence of a large number of information systems without significant connections between them, often a lot of time is wasted on making a seemingly simple reference. This burdens both the academic and administrative staff as well as the management staff. A new unified structure of a unified information system is proposed, managing the flows of information coming to the university and sent to external organizations, in order to improve the quality and speed of work. The proposal could be used for other universities and structures.

**Keywords:** Academic Staff; Information system

**JEL Codes:** I23, O32

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THURS-ONLINE-1-QHE-07

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## **A MODEL FOR BUILDING AND FOSTERING KEY COMPETENCES IN ACADEMIC ENGLISH TO INCORPORATE 21ST CENTURY SKILLS**

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**Abstract:** *Developing learners' competence and grounding teaching, learning and assessment in competence has been one of the central issues in European educational policy for the last decade. The emergence of the concept of competence-based education is related to the long-standing debate on the skills and competences students need to develop to meet the requirements of present-day economic and social changes. A number of frameworks describing 21<sup>st</sup> century skills and competences have been offered by major international organisations, consortia of business and educational institutions and individual researchers. Countries around the world have adopted many of the skills and competences described in these frameworks in their educational standards taking into consideration national contexts. The debate how to best implement sound principles of teaching and assessment of 21<sup>st</sup> century skills and key competences is continuing on different levels – international, national, institutional and individual.*

*Following this trend a project entitled A Model for building and fostering key competences in academic English to incorporate 21 century skills was launched by the Foreign Languages Department at Ruse University in Bulgaria. The overall aim of the project was to suggest ways of innovating curriculum and practices in the English as a Foreign Language (EFL) module to meet the challenges posed by the COVID pandemic and keep teaching aligned with the values of contemporary education. One of the major outcomes of the project is a model for teaching EFL to be adopted by faculty members. The model is based on an analysis of some of the existing conceptions of 21<sup>st</sup> century skills and competences for lifelong learning and a survey of students' needs.*

**Keywords:** 21<sup>st</sup> century skills, lifelong learning, English as a Foreign Language.

**JEL Codes:** I23

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## THE DEVELOPMENT OF COMMUNICATION SKILLS - A PLEDGE FOR THE SUCCESSFUL CAREER OF THE STUDENTS IN "SOCIAL ACTIVITIES"

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**Abstract:** *The paper considers the forming and subsequent development of communication skills as essential for the professional realization of bachelor students in "Social activities" due to the central role of the different communication practices in social work. The traditional understanding supposes that the communication skills and competencies have a complementary character for improving the education of social workers. The present paper is aiming to show that they are implicit both for the quality of social work and the successful realization in the field of social activities. A model of building and developing relevant communicative skills and competencies during the bachelor education in "Social Activities" is also proposed, based on the nature of the specialty and the global trends in providing social services.*

**Keywords:** *social work, communication skills, bachelor education in "Social Activities"*

**JEL Codes:** *I20, I21, O15*

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## ONLINE TEACHING IN HIGHER EDUCATION IN THE FIELD OF INDUSTRIAL DESIGN

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**Abstract:** Higher education is in a state of transition with the implementation of the Strategy for Development of Higher Education in the Republic of Bulgaria in the period 2021-2030. One of the key processes in the functioning of the higher education system is the application of adequate educational technologies and approaches. The coronavirus pandemic also has a significant impact. A leading change in the education system comes down to the manifestation of online learning, which requires monitoring the quality of higher education in a state of visible transformation.

The question that arises is whether students receive high quality education and how they react to this change. The second and equally important question is whether lecturers manage to adapt to this change and, more importantly, whether they find perspective instead of difficulty in the course of this process. The present work aims to trace the advantages and disadvantages of online learning in higher education and in particular in the field of industrial design education.

**Keywords:** higher education, transition, coronavirus pandemic, online learning, students, advantages and disadvantages, industrial design.

**JEL Codes:** I23

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THURS-ONLINE-1-QHE-10

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**COMPARATIVE ANALYSIS OF SOME ASPECTS THE EUROPEAN AND BULGARIAN PROGRAM FRAMEWORKS FOR STEM EDUCATION**

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**Abstract:** *The paper presents the results of a comparative analysis of some aspects of the European and Bulgarian program frameworks for STEM education, which are outlining the policy of smart specialization in secondary and higher education. On this ground, the coherence and differences in prioritization of common problems and shared interests are examined considering the key actors, who are implementing the policy. The relations between the professional realizations and the new labor market requirements are also clarified as well as the link between the quality of education, the competence framework of the STEM-oriented students and their impact and significance for the regional development are discussed. The conceptual content analysis of official documents (e.g. strategies, programs, and plans) has been chosen as a relevant method for identifying and analyzing the fields of concordance as well as the gaps between the European and Bulgarian strategic planning in terms of STEM education.*

**Keywords:** STEM, strategic planning, quality of education, Comparative analysis

**JEL Codes:** I20, I21

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STEM coalition: URL: <https://www.stemcoalition.eu/>

THURS-ONLINE-1-QHE-11

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**ACSEA<sup>2</sup> PRINCIPLES OF PM KNOWLEDGE AND SKILLS ACQUISITION  
AS A DRIVER FOR THE QUALITY OF EDUCATION**

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**Abstract:** *The most often met case in curricula development at the university level (bachelor or master) concerns the introduction of Project management (PM) as an integral part of all type managers' competency profile but regardless of the specialties. The final result usually is excellent project managers without any engineering background or engineers who are not familiar with the project logic. The paper considers the model of PM knowledge and skills acquisition as drivers for the quality of education, based on an integrated approach of understanding, teaching, and applying PM body of knowledge. The discussed ACSEA<sup>2</sup> principles define the specific integration between the PM approach and STEM approach avoiding the unnecessary „engineerizing" of the project management field neither neglecting soft PM - skills for the project's success. The ACSEA<sup>2</sup> competency map of the project leader is discussed and considered as a driver for the quality of education in PM.*

**Keywords:** *project management, competencies, STEM, quality of education*

**JEL Codes:** *O10, O22, M10, L00, I23*

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NOVEMBER RESEARCH CONFERENCE IN RAZGRAD

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FRI-ONLINE-KS(R)-01

CRYSTAL CHEMICAL AND POWDER X-RAY DIFFRACTION STUDY OF  
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PIGMENTS

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**Abstract:** Clinopyroxenes collected from volcanic, intrusive, and metasomatic rocks were investigated. Powder X-ray diffraction and electron probe microanalysis (EPMA) were performed to characterize the studied clinopyroxenes. X-ray diffraction data and unit cell parameters determine the pyroxenes as monoclinic, space group C2/c. In the present study, we present the composition of the clinopyroxenes in terms of major and minor elements and characterize the effect of the elements on the crystal structure. The pyroxene group minerals have the general formula  $M2^{2+}M1^{2+}T_2^{4+}O_6$ , where M2 refers to cations in a generally distorted octahedral coordination, M1 to cations in a regular octahedral coordination, and T to tetrahedrally coordinated cations. The T-site is mainly occupied by Si and  $(Si+Al^{3+}+Fe^{3+})$  in the case of silica undersaturated end members of the group. The M1-site is occupied by Al, Fe, Mg, Cr, Ti, while the M2-site by Ca and Na. According to the crystal chemical formulae (calculated on the basis of six oxygens) the studied pyroxenes belong to three different series: diopside-hedenbergite, diopside-augite, and silica undersaturated Ca-clinopyroxenes with high content of aluminium in the tetrahedral site of the crystal structure. The obtained results are compared with those of synthesized ceramic pigments at different temperatures and the differences in crystal chemistry and powder X-ray patterns are discussed.

**Keywords:** Clinopyroxene, X-ray powder diffraction, EPMA, ceramic pigments.

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## IMPROVING THE EFFICIENCY OF PROCESSES AND EQUIPMENT OF BAKING PRODUCTION

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**Abstract:** *The Scientific School of Bakery Processes and Equipment, which operates at the National University of Food Technology (Kyiv, Ukraine), has a number of scientific developments that take into account the world's leading trends in the industry and significantly improve product quality, productivity and hygiene requirements. The essence of the proposals concerns the following processes:*

- *Use of kneading machines with cam working bodies. This allows to ensure the high quality of the third stage of kneading - plasticization.*
- *Combination of dough fermentation operations and forming pieces under pressure in one unit. This reduces fermentation time, reduces the number and metal consumption of equipment.*
- *Combination of baking and drying processes for some varieties of bread products, in particular, rusks and chopsticks. This avoids heat consumption for reheating the products, the amount of equipment.*
- *Rational use of heat of steam of hygrothermal processing and heat of secondary steam which is formed during baking of bread.*
- *Vacuum cooling of bread products. This ensures fast cooling of bread before cutting and packing.*
- *Stream cutting of different types of bread.*
- *The use of packaging equipment based on integrated technical complexes created on the basis of mechatronic functional modules, each of which is a functionally and structurally independent product with a large number of synergistically interrelated characteristics and parameters.*

*Each of these proposals is examined by competent experts and substantiated. The total result is an increase in product quality, productivity and safety, ensuring hygienic requirements, reducing the number of equipment and ensuring its versatility.*

**Keywords:** *bread, equipment, kneading, fermentation, forming, recuperation, baking, cooling, cutting, packaging.*

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**SYNTHESIS OF GARNET PIGMENTS AT LOW TEMPERATURE**

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**Abstract:** Garnet ceramic pigments were synthesized by the method of solid-phase sintering. The starting materials are pure oxides: CaO, SiO<sub>2</sub>.nH<sub>2</sub>O. The following elements have been added as chromophores: V, Fe and Cr. For this purpose, the following raw materials were used: NH<sub>4</sub>VO<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub> and K<sub>2</sub>Gr<sub>2</sub>O<sub>7</sub>. The pigments were synthesized at a final firing temperature of 1000 °C. The color characteristics of the synthesized ceramic pigments were determined using a color measurement system - CIELab.

**Keywords:** garnet pigments, solid-state sintering, CIELab color measurement

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## CROSS-BORDER REGIONS COLLABORATE FOR BLUE GROWTH

### PART 1. EXPLORATORY MONITORING OF AQUATIC ECOSYSTEMS

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**Abstract:** *Black Sea, with its water catchment area and coastal ecosystems, could be considered as a natural laboratory of global importance for fundamental science, sustainability policy and blue economy. That is why its protection is a task that can be solved with a long-term program for sustainable consumption of this valuable resource and will be successful if it uses as a basis the existing scientific capacity and knowledge and the created opportunities for research and monitoring of the ecological condition of Black Sea local ecosystems and plans and implements various initiatives related to nature conservation and responsible behavior, involving the local community. Nowadays-in the time of changes and scientific discoveries for the success of this task are especially important also, the development and implementation of innovative projects - to increase the value of the local services, related to the water ecosystems and sustainable use of resources and the development and implementation of common methodologies and approaches in the applied research at national and international level.*

**Keywords:** *Black sea, water ecosystem, environmental monitoring, Blue Growth*

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## STUDY OF DIOPSIDE CERAMIC PIGMENTS WITH RARE EARTH ELEMENTS

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**Abstract:** Diopside ceramic pigments with basic diopside phase  $\text{MgCaSi}_2\text{O}_6$  were synthesized by solid phase sintering with pure raw materials:  $\text{CaCO}_3$ ,  $\text{MgO}$ ,  $\text{SiO}_2 \cdot n\text{H}_2\text{O}$ ,  $\text{Pr}_6\text{O}_{11}$  and  $\text{Er}_2\text{O}_3$ . The pigments were synthesized at three final firing temperatures: 1000, 1100 and 1200 °C. The resulting ceramic pigments were examined by powder X-ray diffraction, infrared spectroscopy, electron microscopy, electron paramagnetic resonance. The color characteristics were measured spectrophotometrically using a color measurement system - CIELab. The best pigments are applied in white cover glaze for faience.

**Key words:** diopside pigments, solid-state sintering, CIELab color measurement

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## DEVELOPMENT OF A NEW TYPE OF ALCOHOLIC ICE CREAM

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**Abstract:** The modern range of milk-based ice cream with an alcohol component was analyzed. The choice of alcoholic tincture in the composition of milk ice cream was substantiated. The cryoscopic temperature of the mixtures was determined using a measuring complex, the dynamic viscosity was determined by a Hepler viscometer, the melting resistance was determined by the melting time of the hardened ice cream samples, and the ice cream was whipped by the weight method. The possibility of using tinctures with an alcohol content of 20% as a part of milk ice cream has been scientifically confirmed. The selection of the structure stabilizer and rational modes of maturation of milk-alcohol mixtures were substantiated by the values of the coefficient of dynamic viscosity. According to the cryoscopic temperature of ice cream mixtures, it was found that the production of ice cream with a mass fraction of alcohol up to 3% determines the possibility of using conventional freezing modes to obtain a product of guaranteed quality. A new type of milk ice cream with the use of tinctures can be recommended for the introduction of the classical technological scheme of production with the clarification of maturation modes.

**Key words:** tinctures, ice cream, cryoscopic temperature, maturation

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## ENERGY PARAMETERS OF THE PROCESS OF ULTRAFINE GRINDING OF MEDICINAL AND COSMETIC COMPONENTS IN A BEAD MILL

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**Abstract:** *The process of ultrafine grinding of components of medicines and cosmetics in a laboratory bead mill is considered. The purpose of the study is (1) to determine the energy parameters of the process of ultrafine grinding of medicinal and cosmetic components in a bead mill, as well as (2) to determine the dependences of changes in technological parameters. A suspension of castor oil and cosmetic pigment in a ratio of 60% oil and 40% pigment was used as a model body. A series of experiments was carried out, where the degree of grinding was determined using a microscope with a built-in camera and software, the temperature was measured with ds18b20 temperature sensors, the power was measured with a three-phase CNFAJ Intelligent Power Meter. When grinding the pigment "red 120" for a period of time from 0 to 45 minutes, the power decreases, the temperature of the "beads-product" system increases, and the particle size decreases. This process occurs most intensively in the first 5 minutes. Most of the energy is spent on the work, which is spent on mixing the system "beads-product", and the work, that is spent on heating the structural components of the product and the parts of the mill interacting with them, which, in turn, depend on rheological properties of the suspension.*

**Keywords:** *grinding, beads, mill, energy, suspension.*

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## INFLUENCE OF VACUUM COOLING METHOD ON QUALITY INDICES OF BREAD

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**Abstract:** The method of vacuum cooling allows to cool the bread quickly, reduce the production area for cooling, to provide sterile process conditions. The influence of cooling modes on the quality of wheat bread was studied.

The bread was cooled under a vacuum of 4–6 kPa, the rate of pressure reduction varied from 2 to 8 kPa/s. Structural and mechanical properties of bread were determined by the method of penetration.

The critical rate of pressure drop was 4.5 kPa/s, at higher speeds the structure of the bread is destroyed, the crust is separated from the crumb. Bread cooled under vacuum stimulates freshness (elasticity) longer than after the usual, natural method of cooling.

**Keywords:** Bread, Cooling, Vacuum, Crumb.

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## LACTOSE INTOLERANCE AND ORAL HEALTH

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**Abstract:** Lactose intolerance has various manifestations and symptoms. It can be congenital - alactasia, but it can also be acquired over the years. Approximately 65% of the world's population has this condition since birth. On closer inspection, approximately 70% of East Asian adults are found to be lactose intolerant. The paper reviews the lactose intolerance worldwide, paying particular attention to the available information for Europe. European Dairy Association reported the Hungary, Estonia, Greece and Italy had over 40% frequency of lactase deficiency. There are no enough studies about the problem in Bulgaria. Original results from a questionnaire survey conducted in Bulgaria are presented. The possible connection of the ethnicity of the people with possible lactose intolerance was traced. Facts related to the change in oral health while avoiding the consumption of lactose-containing products (milk and dairy products) are presented and discussed. A group of foods that would be useful for people with lactose intolerance to protect their oral health are presented.

**Keywords:** lactose intolerance, oral health, vitamin D, calcium, milk.

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## SPECTROPHOTOMETRIC ANALYSIS OF RETINOL AND BETA-CAROTENE IN MILK

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**Abstract:** Milk is an essential part of the daily foods. Natural milks contain certain amounts of micronutrients such as vitamins and carotenoids. Vitamins are crucial for the proper development of the baby, as well as adolescents and adults. These substances cannot be synthesized de novo in the human body and therefore they provided through food. The concentration of the carotenoids in cow milk is critical point for the implementation of complete nutrition. In this study, spectrophotometric analyzes are persented for retinol (vitamin A) and  $\beta$ -carotene for UHT milk samples. Different mixtures of organic solvents were used and compared. Linear ranges of retinol and  $\beta$ -carotene in standard solutions were obtained by using hexane as solvent. The equations obtained for these curves were used to determine the target substances in real cow milk samples.

**Keywords:** retinol, beta-carotene, carotenoids, spectral analysis, milk, vitamin A.

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## TECHNOLOGICAL ASPECTS IN THE APPLICATION OF EDIBLE COATINGS

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**Abstract:** The search for better strategies for preserving food with minimal changes during processing has been of great interest in recent decades. A solution is to apply coatings to minimally processed fresh foods. Most publications and scientific literature comment on the composition and properties of edible coatings. Various aspects are considered, mainly of a functional nature. It should be noted that in most cases it is a question of laboratory experiments and results of the effect of various coatings with additives on the protective function of the coating, its physical, physicochemical, antibacterial and other properties. There is only a small discussion about problems related to the industrial application of edible coatings and especially on the technological aspects of their application on specific food products. The presented material reviews the information from various literature sources about the methods and equipment through which the coatings are applied. An attempt has been made to summarize the main problems and the solutions adopted so far for the industrial application of edible coatings on various food products.

**Keywords:** edible coatings, edible packaging, deposition of edible coating, coating formation.

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**POSSIBILITY FOR USE OF OLD DRUGS IN THE THERAPY OF NEW DISEASES**

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**Abstract:** *In the context of a global pandemic, it is important for the medical and pharmaceutical community to find effective drugs for socially significant diseases, which in turn is connected with the possibility of their rapid release on the market. However, the development of new drugs involves a lengthy process. The entire process – from concept through preclinical testing in the laboratory to clinical trial development, including Phase I–III trials – to the approved drug typically takes more than a decade. This enables medical professionals to use already known drugs in the treatment of new or rare diseases for which no conventional treatment has been established. The repurposing drugs have a number of advantages and represent a promising direction in the treatment of a number of diseases.*

**Keywords:** *pandemic, development of new drugs, repurposing drugs, rare diseases.*

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## IN SILICO PREDICTING METABOLIC ACTIVATION OF METRONIDAZOLE IN LIVER

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**Abstract:** Metronidazole is an antimicrobial drug with wide spectrum of activity. The aim of this work is to predict the probable metabolic activation of metronidazole in the liver (in vivo and in vitro rat) and to determine the protein and DNA binding of its metabolites by OECD QSAR Toolbox. The parent structure of metronidazole can bind to DNA (Radical mechanism via ROS formation and  $S_N1$  mechanism of action) but it cannot bind to protein and experimental metabolic pathways of action were not observed for rat in vivo and in vitro. The generated metabolites after hepatic metabolic activation simulator for both conditions (in vivo and in vitro rat) are nine and seven, respectively. The reactive metabolites for both (in vivo and in vitro) have different mechanisms of action (Radical mechanism via ROS formation,  $S_N1$ ,  $A_N2$  and  $S_N2$ ) by DNA binding. Some reactive metabolites are with the following mechanism of action (Schiff base formation) by protein binding.

**Keywords:** metronidazole, prediction, metabolism, liver, OECD QSAR Toolbox

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## COMPARATIVE ANALYSIS OF BIODIESEL PRODUCTION TECHNOLOGIES USING SUITABLE RAW MATERIALS

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**Abstract:** This paper draws attention to the technological feasibility of biodiesel production from various raw materials. It examines both the stages of pre-processing of raw materials as well as the possibilities for transesterification and the combination of individual technologies for obtaining quality biodiesel in an environmentally friendly way. Conclusions for optimal selection of raw materials and technologies are made on the grounds of analysis and comparison.

**Keywords:** Biodiesel, Biomass, Transesterification

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## BIOACTIVE GLASS CRYSTALLINE MATERIALS OBTAINED BY SOL-GEL METHOD

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**Abstract:** The article is devoted to the establishment of the method of obtaining glasses of a given chemical composition in the system  $\text{Na}_2\text{O} - \text{CaO} - \text{SiO}_2 - \text{P}_2\text{O}_5$ , which involves the use of sol-gel method. The method involves the use of the following raw materials: ethyl silicate  $(\text{C}_2\text{H}_5\text{O})_4\text{Si}$  as a source of gelation, phosphoric acid  $\text{H}_3\text{PO}_4$  and soluble salts of  $\text{Ca}(\text{NO}_3)_2$  and  $\text{NaNO}_3$ . The synthesis of the material takes place with constant stirring during gelation and subsequent calcination at a temperature of at least  $600^\circ\text{C}$ . This technology involves reducing energy consumption for production and improving the basic characteristics of the glassy material. The glasses obtained by this technology can be used in the production of bioactive glass crystalline materials.

**Keywords:** Sol-gel method, Ethyl silicate, Bioactive glass, Calcination, Glass crystalline materials

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## CROSS-BORDER REGIONS COLLABORATE FOR BLUE GROWTH PART 2 – INDICATORS (FACTORS) INFLUENCING THE LIFE CYCLE OF BIOCECENOSIS ORGANISMS

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**Abstract:** Black Sea, with its water catchment area and coastal ecosystems, could be considered as a laboratory of global importance for fundamental science, sustainability policy and blue economy. The occurring changes in the ecosystems also have an impact on the development of the biocenotic organisms inhabiting them. The present study examines abiotic factors (indicators) such as: sediment, temperature, salinity, hydrodynamic turbidity and heavy metals, which are essential for the life cycle of biocenosis organisms that affect the shell of the *Rapana venosa*, *Valenciennea*; *Chamelea gallina* and *Donax trunculus*.

**Keywords:** Black sea, Biocenosis organisms, *Rapana Venosa*, Mussels, Shells

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## EFFECT OF TEMPERATURE ON THE KINETICS OF OLEIC ACID ESTERIFICATION PROCESS WITH TRIMETHYLOL PROPANE (TMP)

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**Abstract:** The present study investigates the kinetics of esterification of oleic acid with trimethylol propane at different process temperatures. 1% p-TSA was used as catalyst. The process was carried out under vacuum and the reaction rate was monitored by analyzing the acid number of the mixture. The reaction was studied at following temperatures: 90, 105, 120 and 150 °C, and the duration time was 1200 min. There was noticed significantly higher speed of the process at temperature of 150 °C in comparison with the other studied reaction temperature. However, final acid values recorded at 120 °C and 150 °C and time duration of 1200 min are close, i.e. 2.71 and 2.5mgKOH/g, but they are significantly lower than acid values observed at 90 °C and 105 °C, which are 5.66 and 4.35 mgKOH / g, respectively

**Keywords:** Trimethylol propane, Biodegradable lubricants, Oleic acid, Esterification, p-TSA

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## CONTINUOUS CONSTANT VOLTAGE ANODIZING OF ALUMINUM

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**Abstract:** The kinetics of continuous constant voltage ( $U_V = \text{const}$ ) anodizing of aluminum (AA1050) in an electrolyte, with no dissolving action (aqueous borate electrolyte) on the formed anodic alumina was studied in the present work. The recorded  $J_{\text{total}}(t)$ -dependencies are interpreted on the basis of the notion that the total current ( $J_{\text{total}}$ ) flowing in the Al/Al<sub>2</sub>O<sub>3</sub>/Electrolyte system includes an ionic ( $J_i$ ) and an electronic ( $J_e$ ) component, i.e.:  $J_{\text{total}} = J_i + J_e$ . The dependences of these two components on the electric field strength ( $E$ ) and temperature ( $T$ ) are discussed considering existing theoretical concepts. The analysis of the kinetics undoubtedly shows that the presence of an electronic component in the total current flowing under conditions of continuous constant voltage anodizing in the (+)/Valve metal/Anodic oxide/Electrolyte systems should not be neglected.

**Keywords:** barrier anodic Al<sub>2</sub>O<sub>3</sub> film, constant voltage anodization, ionic and electronic current component

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## SINGLE-FACTOR ANALYSIS ON THE KINETICS OF OLEIC ACID ESTERIFICATION PROCESS WITH TRIMETHYLOL PROPANE (TMP) AT DIFFERENT AMOUNTS OF P-TSA AS CATALYST

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**Abstract:** The present study investigate the kinetics of esterification of oleic acid with trimethylol propane at different amount of catalyst: 0,5, 1% and 5%. p-TSA was used as catalyst and was compared to kinetic of process without catalyst. The process is carried out under vacuum, reaction temperature 120 ° C and the time duration of 1200 min. Best results and significantly higher reaction rate of the process were recorded at 5% p-TSA mgKOH/g respectively, but we observed high darkness of the mixture and have some problems with washing of the mixture probably due to increasing of emulsification properties of reaction mixture at higher amounts of catalyst.

**Keywords:** Trimethylol propane, Biodegradable lubricants, Oleic acid, Esterification, p-TSA

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**SYNTHESIS OF 6-NITRO- AND 6-AMINO- DERIVATIVES OF 2-(2,4-DIOXO-1,3-DIAZASPIRO[4.5]DECAN-3-YL)-1H-BENZO[de]ISOQUINOLINE-1,3(2H)-DIONE**

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**Abstract:** This article describes the synthesis of 6-nitro- and 6-amino- derivatives of 2-(2,4-dioxo-1,3-diazaspiro[4.5]decan-3-yl)-1H-benzo[de]isoquinoline-1,3(2H)-dione. The structures of the obtained compounds were proved by physicochemical parameters, elemental analysis, IR, <sup>1</sup>H and <sup>13</sup>C NMR spectral data. The antimicrobial activity of the synthesized compounds against various microorganisms was studied.

**Keywords:** 1,3-phenalenediones, isoquinolines, spirohydantoins, antimicrobial activity

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**LEAN-PRODUCTION: PRINCIPLES AND TOOLS**

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**Abstract:** To reach a new level of development, the food industry definitely needs new technologies, technical solutions for the development of which are directed to many investments coming into the industry.

The food industry needs to change, and the tools available to make it successful are LEANs, which are relatively easy to use and effective. This can increase the value of products, help solve the problem of supply-demand, develop followers and improve performance.

Lean production involves the involvement of each employee in the optimization process and maximum customer focus. According to the concept of lean production, all activities of the enterprise are divided into operations and processes that add value to the consumer, and operations and processes that do not add value to the consumer. The task of "lean production" is the systematic reduction of processes and operations that do not add value.

Lean production is not done. This is a constant improvement in the little things. With Lean there are no grand innovations, only continuous improvement in small steps.

**Keywords:** Lean, Production, Development, Food, Industry.

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## DEVELOPMENT OF CHEESE FILLING TECHNOLOGY FOR MEAT INDUSTRY, IN CONDITIONS OF DEFICIENCY OF DAIRY RAW MATERIALS

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**Abstract.** *The issues of development of cheese products technology for further use as a part of sausage products are covered in the work. Model samples of cheese products based on protein concentrates using a stabilization system, dyes and flavoring mixtures. The main organoleptic and physical-technological indicators of the developed products are investigated. The hardware-technological scheme of production is developed, taking into account the minimum production areas and additional equipment of equipment, for direct production of this product at the meat-processing enterprises. The use of the developed mixture for the production of cheese products will allow to produce a wide range of products in regions with a shortage of traditional raw materials. The production of cheese products on the basis of protein concentrates makes it possible, at the initial level, to control the content of milk protein in the finished product.*

**Key words:** *cheese, cheese product, milk, protein concentrates.*

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## ADVANCED TECHNICAL SOLUTIONS FOR YEAST DOUGH KNEADING

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**Abstract:** In the bakery industry, the most labor-intensive production have special varieties of bread products: bakery and rusks, bread sticks and others. This is due to the more complex technological scheme of production and the insufficient level of its mechanization. Different types of machines are used for kneading yeast dough, which, depending on the type of flour, recipe composition and features of the range, have different mechanical effects on the dough. To obtain a high quality dough, it is necessary to apply the kneading process taking into account the specifics of the mode and the optimal process parameters: kneading intensity, the influence of the rotational speed of the working element and the duration of kneading. In the production of bakery products there are trends in the use of accelerated dough technology, which leads to the intensification of the process of kneading the dough and the development of continuous kneading machines to ensure continuous flow production.

In the food industry, it is advisable to develop and implement new technologies, constructive working element, increase productivity and improve the quality of finished products. The use of machines of uniform-flow action with highly productive working element will allow to mechanize and automate production processes, to exclude the use of human labor, to reduce energy consumption, to ensure high quality of finished products.

**Keywords:** Bakery, Industry Kneading, Dough, Technical, Cam.

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## USE OF ALTERNATIVE SWEETENERS IN ICE CREAM

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**Abstract:** *The article is devoted to research aimed at improving the technology of ice cream through the use of sugar substitutes and their compositions that exhibit functional and technological properties and improve the quality of the finished product. The feasibility of using starch syrup and polyols for the formation of recommended organoleptic, physical and chemical characteristics of ice cream, and their stabilization during the guaranteed period of storage is scientifically substantiated. The main criteria for the choice of sugar substitutes in the composition of different types of ice cream are selected such characteristics as the degree of sweetness, cryoprotective and structural ability. The article describes the results of analytical and experimental research methods: rheological characteristics and cryoscopic temperature of mixtures, organoleptic characteristics of ice cream, whipped cream, resistance to melting. According to the same criteria, the expediency of complete replacement of sucrose in the composition of ice cream with erythritol and its composition with glucose syrup in the ratio of 90:10 to 50:50 was confirmed. The conclusion about the possibility of purposeful technological effect in the cycle of ice cream production with erythritol and composite mixtures of starch syrup with different degree of saccharification is formulated.*

**Keywords:** *Cryoscopic Temperature, Ice Cream, Polyols, Structuring Ability, Sweeteners*

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## DEVELOPMENT AND MARKETING TRENDS OF FLEXIBLE PACKAGING MATERIALS

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**Abstract:** *The paper reviews the main aspects of current market status of flexible packaging materials. The properties of the materials are indicated, which determine their advantages in comparison with other packaging materials. The current data of the analysis of the flexible packaging materials market are provided. The main trends in the flexible packaging development are considered, such as: individualization and convenience; optimization (design) of materials and processes; concern for human health and food safety; packaging in a pandemic and after COVID-19; e-commerce and contactless delivery, environmental aspects. The role of flexible packaging in circular economy implementation is defined. Examples of modern flexible packaging designed to meet the requirements of the circular economy are given.*

**Keywords:** *flexible packaging; polymer; monomaterials; recycling; sustainability; circular economy.*

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## SIMULATION MODELING OF THE ULTRAFINE GRINDING PROCESS IN A BEAD MILL

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**Abstract:** *It was conducting the modelling of the grinding process in a laboratory bead mill with a standard working elements configuration using simulation software. The purpose of the study is to determine the stress-strain state of the structure, the speed of movement of the system "beads-product", pressure and temperature in the working chamber. A suspension of castor oil and cosmetic pigment was used as a model body. The properties of the suspension were previously investigated to determine the rheological properties. When running a simulation in the laboratory bead mill using simulation software, it is clearly seen the areas where mixing, friction and grinding are most effective. In these zones, the contact of the working elements (beads) with the ground product in the suspension is maximum, which is expressed in the release of a large amount of heat.*

**Keywords:** *grinding, beads, mill, modelling, energy, suspension.*

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## THE BIOMASS OF CONIFEROUS PLANT SPECIES AS A BIOENERGY RESOURCE – MINI REVIEW

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**Abstract:** The usage of biomass from coniferous species is one of the most sustainable methods for using renewable energy sources. Forest wood or biomass from the essential oil industry can be used as an alternative energy source. The conversion of biomass into an energy source includes mainly thermal methods (pyrolysis, gasification, combustion). Coniferous biomass can be transformed into extrudates, pellets, or composite in the form of solid fuels during conversion methods. The application of the techniques of the circular economy through the use of coniferous biomass will contribute to the ecological and socio-economic indicators of Bulgaria. This review may focus on the potential applications of biomass from the logging, wood processing, and essential oil industries, and mainly in the use of coniferous species.

**Keywords:** Bioenergy potential, Coniferous species, Alternative energy resources, Biofuels

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## GRAPE SEED ANTIOXIDANTS

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**Abstract:** Grapes and related grape derivatives contain various biologically active components useful for human health. A large group of these components are phenolic antioxidants, including anthocyanins, catechins, resveratrol, phenolic acids and procyanidins. Flavonoids make up the majority of phenolic compounds (65-76%) in grapes. Anthocyanins are a major part of flavonoids and are found in high percentages in red grapes. Most of the grape phenolic antioxidants are distributed in the skins and seeds of grapes. The phenolic compounds resveratrol, anthocyanin and catechin are concentrated in the skins, while the procyanidins are concentrated in the grape seeds. The oligomeric and polymeric procyanidins in grape seeds have a wide range of pharmacological and therapeutic properties and are one of the most powerful natural antioxidants. In recent years, these proanthocyanidin compounds have been extracted and purified from grape seeds and are offered as valuable dietary supplements.

**Key words:** antioxidants, red grapes, white grapes, grape seeds

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## EFFECT OF CHICKPEA FLOUR ON SOME INDICATORS OF WHEAT CAKE DOUGH AND QUALITY OF PRODUCTS

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**Abstract:** *The effect of chickpea flour on some indicators of wheat cake dough and the quality of products was studied. It was found that the addition of chickpea flour into wheat make leads to a change in some properties of the dough and the quality of the product. As the quantity of chickpea flour increase, as the dough density increase. After sensory profil, it was found that the samples have a highly intense color of the upper crust. There is the presence of smaller, unevenly distributed pores, the chewability is identical to that of the control sample. After all the tests, it was found that it is possible to replace wheat flour with up to 20% chickpea flour.*

**Keywords:** Chickpea flour, products quality, sensory analysis

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## GRAPE ANTIOXIDANTS IN MEAT AND MEAT PRODUCTS

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**Abstract:** Lipid oxidation is one of the biggest important problems that reduce the shelf life of meat and meat products. Delaying the oxidation of lipids and development of unpleasant odors, as well as improving color stability is done with the help of antioxidants. Antioxidants are divided into two groups - natural and synthetic. Synthetic antioxidants intake leads to cancer and acute toxicity. Therefore, in recent years, the food industry prefers natural to synthetic antioxidants. This review presents current trends in the use of antioxidants from grape extracts to inhibit lipid oxidation of meat and meat products. The results show that grape seed contains effective antioxidants for use in meat and meat products and those natural antioxidants can completely replace synthetic ones.

**Keywords:** lipid oxidation, meat, meat products, antioxidants, grape seed

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## STUDY OF THE MAGNESIUM CONTENT IN GLUTEN-FREE TYPES OF FLOUR

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**Abstract:** Nowadays, many of people pay attention to healthy eating and consumption of food products rich in biologically active substances. Such products help prevent the deficiency of various macro- and microelements caused by malnutrition. This aroused our interest in studying the magnesium content of gluten-free types of flour: from quinoa, amaranth, buckwheat, carob and chickpeas. The results reveal that the magnesium content of gluten-free flours varies from 594,00 mg/kg (carob flour) to 1915,00 mg/kg (amaranth flour) and is higher than that found in wheat flour type 500 – 130,75 mg/kg. The determination of magnesium content is performed by using highly sensitive AES-ICP method.

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## PRODUCING BIOGAS BY APPLIYNG ELECTRICAL CHARGE

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**Abstract:** *The paper reviews the methods of applying electrical charge to manure, which is important part of the anaerobic fermentation, in order to produce biogas. During the experiments, different voltages are applied to the manure. The aim is to investigate the influence of the electrical charge with manure. It's believed that the electric charge improves the process of anaerobic digestion and results in higher yield of biogas with higher methane content. The experiment consists of two main parts: part one is the plant material, which is treated with acid and part two which is the manure treated with electric charge. After the two materials are treated, they are mixed and placed in glass bottles, which are hermetically closed and attached to biogas collectors. Then the bottles are placed in a water bath at 35 ° C. Samples were taken daily for analysis.*

**Keywords:** Biogas, plant material, electric charge, methane content

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## **MICROBIOLOGICAL EVALUATION OF READY-TO-EAT SUNFLOWER SEEDS**

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**Abstract:** *The subject of this report is a microbiological evaluation of four batches of ready-to-eat sunflower seeds. The total number of microorganisms, the presence of coliforms, Staphylococcus aureus and Salmonella were found. The obtained results were compared with the regulatory requirements for the product and it was found that the four batches of sunflower seeds meet the requirements.*

**Keywords:** *Sunflower seeds, Microbiological contamination, Coliforms, Staphylococcus aureus, Salmonella*

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