THE DEPARTMENT OF PRINTING EQUIPMENT AND INFORMATION PROCESSING SYSTEMS

The Faculty of Print Technologies and Media Communications

Contents

1. Staff
2. Teaching activities
3. Majors
4. The main trends of scientific research
5. Scientific Research Results
6. Proposals for cooperation
7. Contact information

General information

The founder of the scientific school on research and development of methods and technologies improving the quality of functioning of control systems for printing processes and equipment is Viktor Stepanovich Yudenkov, Ph.D., associate professor, senior researcher.

Year of foundation - 2001.

Heads of scientific directions:

Yudenkov Viktor Stepanovich
Shmakov Mikhail Sergeevich
Belyaev Valery Pavlovich
Grudo Sergey Kazimirovich

4

Staff

Part 1

Contents

Shmakov Mikhail Sergeevich

- The Head of the Department since 2011.
- PhD (Engineering), Associate Professor. Has been working at the Belarusian State Technological University since 2006.
- Scientific interests: automatic control systems, computer simulation of systems and devices, optimal control of electromechanical systems. Author of more than 100 scientific and pedagogical papers.
- Teaching activities: delivers the courses of lectures: "Computers, computing systems and peripheral equipment", "Metrology, standardization and quality management of printing processes," "Fundamentals of research and innovation".

Yudenkov Viktor Stepanovich

- Associate Professor. PhD (Engineering), senior researcher.
- Has been working at the BSTU since 2001. The Head of the Department “Printing Equipment and Information Processing Systems” from 2001 to 2011.
- Scientific interests: Automatic control systems for robots and manipulators; control on the basis of microprocessor technology with printing equipment and information processing systems. of 72 papers including 9 certificates of authorship.
- Teaching activities: delivers the courses of lectures: "Theory and systems of automatic control", "Architecture and programming of microcontrollers and microprocessors", "Peripheral devices of a computer".

Beliaev Valery Pavlovich

- Associate Professor, PhD (Engineering), senior researcher.
- Has been working at BSTU since 2002.
- Scientific interests: automatic control of electromechanical systems of industry, including printing equipment. Special qualification in best setting alternating current drives. Author of 25 manuals and books, 52 papers, 18 invention certificates and 4 patents.
- Teaching activities: delivers the courses of lectures: "Electrical machines", "Electronic devices of printing equipment", "Electrical equipment of printing machines of polygraphy".

Ankuda Denis Anatolievich

- Senior lecturer. Master of Technical Sciences MSc (Engineering).
- Has been working at the Department since 2008.
- The developer of educational programs, the compiler and the author of educational and methodical manuals. Scientific interests: automatic control of electromechanical systems of alternating current drives. Author of 10 publications. Co-inventor of 3 patents in the Republic of Belarus.
- Teaching activities: delivers the courses of lectures, carry out laboratory and practical classes in “Printing machinery, automatic equipment and flow lines” and “Platemaking equipment”.

Grudo Sergey Kazimirovich

- Assistant lecturer of the Department, PhD (Engineering).
- Author of 4 publications. Co-inventor of 2 patents in the Republic of Belarus.
- Scientific interests: platemaking in flexographic printing, ultrasonic modification, text and image processing technologies.
- Teaching activities: carry out laboratory and practical classes in "Technology of processing of the text information", "Theory of filtering and improving image quality", "Modeling of information processing systems".

Sulim Pavel Yevgenyevich

- Assistant of the department. M. Sc. Eng.
- The results of scientific and research work are presented in 20 scientific publications, co-author of the patent of the Republic of Belarus.
- Scientific interests: equipment for operative polygraphy, software tools for improving the quality of images.
- Teaching disciplines: "Equipment and technology of prepress processes", "Equipment and technology of pre-printing and printing processes."

Teaching activities:

Part 2

Teaching activities: (1/5)

- Computers, computing systems and peripheral equipment;
- Printing machinery, automatic equipment and flow lines;
- Electronic devices of the polygraphic equipment;
- Microprocessors and microcontrollers;
- Peripheral devices of a computer;

Teaching activities (2/5)

- Technology of processing of the text information;
- Modeling of information processing systems;
- Metrology, standardization and quality management of printing processes;
- Theory of filtering and improving image quality;
- Equipment and fundamentals of pre-press and printing processes;

Teaching activities (3/5)

- Electrical machines;
- Post-printing Processes Equipment;
- Equipment and technology of prepress processes;
- Platemaking equipment;
- Electrical equipment of printing machines of polygraphy;
- Printing equipment;
- Technological equipment of packing and packing units of enterprises

Teaching activities (4/5)

- Fundamentals of scientific research and innovation;
- Software tools for digital information processing;
- Installation, maintenance and repair of printing equipment;
- Automation of technological processes in printing;
- Metrology, standardization and certification in printing production;

Teaching activities (5/5)

- Design of printing equipment and machines;
- Technological equipment for the production of packaging and containers;
- Design of equipment for the production of packaging and containers;
- Installation, operation and maintenance repair of equipment for the production of packaging and containers;
- Electric equipment of flexographic printing machines

Majors

Part 3

Undergraduate degree

- Printing equipment and information processing systems
  - Machines, equipment and information processing systems of printing production
  - Technical operation of packaging production equipment

Master degree

•Machines, aggregates and processes (specialty direction: polygraphic production)

PhD Course

- Major 05 02 13 Machines, units and processes (polygraphic production)
- Educational programs of postgraduate study provide the scientific qualification "Researcher" and are realized in full-time or extramural studies, as well as external PhD course.

The main trends of scientific research

Part 4

Contents

Research and innovative activities (1/6)

Microcontrollers

- Improving the management quality of printing enterprises by developing and implementing software and hardware based on microcontrollers.

Scientific results

- Software and hardware
  - Patents - 1
  - Articles – 2
  - Conference proceedings – 7
  - Proceedings – 1

Research and innovative activities (2/6)

Risography

- Improving the quality of risografic printing through the application of model management.

Scientific results

- Software tool
- Patents - 1
- Articles – 6
- Conference proceedings – 10
- Proceedings – 5

Research and innovative activities (3/6)

Ultrasonic sound

- Improving the performance of flexographic printing plates through selective ultrasonic modification

Scientific results

- Device of ultrasound modification
  - Patents – 1
  - Articles – 4
  - Conference proceedings – 11
  - Proceedings – 10

Research and innovative activities (4/6)

Braille script

- Increase the productivity of the operator's work on the recruitment and imposition of publications for optically challenged through the use of original software

Scientific results

- Software and hardware
  - Patents – 0
  - Articles – 1
  - Conference proceedings – 2
  - Proceedings – 3

Research and innovative activities (5/6)

Electric motor drive

- Increase the accuracy and energy efficiency of printing equipment electric drives through the use of intelligent control systems.

Scientific results

- Software and hardware
- Patents – 1
- Articles – 12
- Conference proceedings – 13
- Proceedings – 5

Research and innovative activities (6/6)

Multimedia

- Development of interactive multimedia tools for the training of specialists in printing.

Scientific results

- Software and hardware
- Patents – 0
- Articles – 10
- Conference proceedings – 24
- Proceedings – 5

Scientific Research Results

Part 5

Development №1

Technologies for increasing the print-operational properties of flexographic photopolymer printing forms

Development №1

Title	**Technologies for increasing the print-operational properties of flexographic photopolymer printing forms**
Description	The increase in the printability of photopolymer printing plates is provided due to an additional process of structuring the polymer material by controlled ultrasonic action in the established energy limits. Selective ultrasonic influence is carried out with the help of a projected installation for local modification of flexographic printing plates.

Development №1

Advantages	The technological regime of energy-efficient local selective ultrasonic processing of flexographic printing plates has been developed, which makes it possible to increase the wear resistance of a polymer material by one and a half times and to reduce the degree of its swelling in a solvent by a factor of 1.3.
Application areas	Enterprises of the printing industry that implement the flexographic printing method.
Technology readiness level	Acts on the practical use of the results of conducted research in production.

Development №1

Cost effectiveness	The expected annual economic effect is 1 800 USD.
Intellectual property rights protection	Two patents of the Republic of Belarus, one application for a patent.
Estimated cost	Estimated cost was not determined
Cooperation proposals	The technology and installation can be used for various composition and thickness of the flexographic photopolymer printing plates.
Contacts	Grudo S. K. Department of "Printing Equipment and Information Processing Systems". Minsk, Sverdlov St., 13A. tel .375 17 327 67 41, grudo@belstu.by

Development №2

Software to improve print quality of digital images on a risograph

Development №2

Title	Software to improve print quality of digital images on a risograph
Description	To perform printing on the risograph, you need a master layout. The original layout can be in hard copy or in electronic format. In electronic form it is preferable to use when high quality copies are needed, where there is not only text but also graphics (photos). Significantly, the following parameters influence the quality of the rhizographic printing: sharpness, clarity, contrast and brightness. The developed system is aimed at managing these parameters, to improve the quality of printing on the risograph.

Development №2

Advantages	A reduction in the additional costs of consumables (paper, master film, paint) when printing on the risograph is provided.
Application areas	Improving the quality of printing digital images on a risograph using an adaptive raster processor.
Technology readiness level	Act on implementation in production
Cost effectiveness	Economic advantages were not counted

Development №2

Intellectual property rights protection	Patent "The way of adaptive rasterization of rizografic printing".
Estimated cost	Estimated cost was not determined.
Cooperation proposals	The software is designed for the specific risograph model(s).
Contacts	Sulim Pavel Evgenievich, post-graduate student. PEIPS; Address: Minsk, ul. Sverdlov 13a, 4a-building 4 E-mail: Sulim@belstu.by Cell. Phone +375 33 314 07 88 Yudenkov Victor Stepanovich, Assoc. Prof. PEIPS, PhD (Engineering). E-mail: Yudenkows@belstu.by Cell. Phone +375 29 665 02 10

Development №3

Software for working with Braille

Development №3

Title	Software for converting to braille
Description	It is specialized software for converting text from standard encodings to encoding, which operates terminal equipment in the printing house. Standard Latin and Cyrillic symbols (included in the Russian, Belarusian and English alphabets), Arabic numerals, punctuation marks, etc. are supported. It is a script that is run from the command line. NodeJS platform is required for operation.

Development №3

Advantages	Work with specific equipment at the printing house, working with non-standard encodings.
Application areas	Work with the output equipment on printing houses specializing in working with Braille
Technology readiness level	Act on implementation in production
Cost effectiveness	Economic advantages were not counted

Development №3

Intellectual property rights protection	Not patentable
Estimated cost	Estimated cost was not determined
Cooperation proposals	The software is designed for the specific output equipment model(s).
Contacts	Shmakov Mikhail Sergeevich, Head of the Department. Department PEIPS; Address: Minsk, Sverdlov Str. 13a, 4a-building office 4 E-mail: shmakov@belstu.by Tel. +375 17 327 67 41 Savinko Artem Andreevich, Ass. Department PEIPS, M. Sc. Eng. E-mail: savinko@belstu.by Tel. +375 17 327 67 41

Multimedia Manuals

Developers:

Shmakov M.S.

Beliaev V.P.

Ankuda D.A.

Multimedia Manuals

Electronic multimedia manuals are used to demonstrate the operation of technically complex equipment, its parts and components.

Advantages of interactive manuals are an opportunity to get acquainted with equipment that is not available in the university's classrooms.

Proposals for cooperation

Part 6

Education sector

- Undergraduate degree
- Major 1-36 06 01 Polygraphic equipment and information processing systems
- Master degree
- Major 1-36 80 06 Machines, aggregates and processes (printing production)
- PhD course
- Major 05 02 13 Machines, aggregates and processes (printing production)

Academia

- Development of the technological process of manufacturing photopolymer flexographic printing forms with optimal printing and technical properties;
- Application Software Development;
- Development of software for microcontrollers;
- Development of control systems for electric drives of process equipment executive mechanisms.

Contact information

Part 7

47

Belarusian State Technological University

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