**Faculty of Technology**

technical university in zvolen



**report**

**on scientific and research activities at ft TU in zvolen for the year 2020**

Proposal for a decision:

Scientific Board FT TU in Zvolen

The 2020 FT report was approved by:

(a) no comments,

(b) with comments

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from the documents of the heads of the FT TU workplaces in Zvolen

Zvolen 2021

Content

[INTRODUCTION 2](#_Toc116562460)

[1 SCIENTIFIC AND RESEARCH PROFILE Facultures of technology 4](#_Toc116562461)

[1.1 Orientation and supporting directions of research 4](#_Toc116562462)

[1.2 Main areas and orientations of scientific research activity 4](#_Toc116562463)

[2 ORGANIZATIONAL, PERSONNEL, FINANCIAL AND MATERIAL – TECHNICAL PROVISION OF SCIENCE AND TECHNOLOGY 6](#_Toc116562464)

[2.1 Scientific research capacity of FT and its qualification structure 6](#_Toc116562465)

[2.2 Thematic concentration and financial provision of research on FT 7](#_Toc116562466)

[3 publishing activity 10](#_Toc116562467)

[3.1 Evaluation of employees' publishing and citation activities 10](#_Toc116562468)

[3.2 Evaluation of publication and citation activities of PhD students 14](#_Toc116562469)

[3.3 Evaluation of implementation activities 16](#_Toc116562470)

[4 scientific and professional events 18](#_Toc116562471)

[5 achieved results in solving science and technology projects 19](#_Toc116562472)

[5.1 Grant projects VEGA, KEGA 19](#_Toc116562473)

[5.2 APVV projects 22](#_Toc116562474)

[5.3 IPA projects and others 23](#_Toc116562475)

[6 Student scientific professional activity 25](#_Toc116562476)

[7 Scientific journal 26](#_Toc116562477)

[8 DOCTORAL STUDIES 27](#_Toc116562478)

[9 CONCLUSION 29](#_Toc116562479)

[10 DRAFT MEASURES FOR 2021 30](#_Toc116562480)

# INTRODUCTION

We submit to the Scientific Council of the Faculty of Technology the Report on Scientific and Research Activities for the year 2020.

The purpose of the report is to:

* capture and document the state of the art in the field of science and research, as well as in other activities in the year 2020 under review,
* quantify parameters from the field of science and research and related publishing activity for some procedures for the redistribution of funds at the faculty,
* ensure continuity and comparability of endpoints,
* summarize the documents for the preparation of materials for the periodic evaluation of the faculty by the bodies of the Ministry of Education, Science, Research and Sport of the Slovak Republic (MŠVVaŠ SR) and the Slovak Accreditation Agency for Higher Education (SAAVŠ),
* to provide the members of the Scientific Council of FT with the basis for obtaining a comprehensive overview of the structure of qualitative and quantitative indicators inthe field of science and research management at the faculty, so that they can adjust the process of organization and direction of scientific research activity by their decision-making and at the same time to gain an overview of the state of affairs in individual departments.

The report shall be compiled in such a way as to provide a comprehensive and objective picture of what is happening in the fields of science and research, scientific education, cooperation, direction and development concepts. The report comprehensively assesses the following areas of science and research:

* scientific and research profile of FT,
* organizational, personnel, financial and material-technical provision of science and technology,
* publishing activities of the faculty,
* scientific and professional events,
* science and technology projects,
* ŠVOČ,
* scientific journal,
* doctoral studies.

For clarity, most of the quantitative indicators and information are compiled into tables and graphs.

The measures adopted for 2020, resulting from the last Report on Scientific Research Activities, have been largely fulfilled.

The aim of the evaluation of the scientific research activities of the FT was to create an objective deduction of the faculty's activities for the year20 20, which was also the third year of fulfillment of the Long-Term Plan of the Technical University in Zvolen for the years 2017 – 2023 with a vision for 2030. It was drawn up in accordance with the requirements of Act No. 131/2002 Coll. on Higher Education Institutions, as amended, and approved by the Academic Senate of the FT. The long-term plan is the basic planning document for ensuring the development of the faculty in all key areas. The long-term objective is an open document, the implementation of the strategic objectives will be evaluated annually on the basis of defined indicators, the measures will be updated, if necessary, in accordance with the change in the internal and external conditions of its implementation.

Not only the scientific and research activities of the faculty in 2020 were affected by the SARS-CoV-2 coronavirus pandemic. Evaluating the scientific and research activity, it can be concluded that in the past year each faculty employee was involved in solving research projects. The publishing activity of the faculty has a balanced and slightly increasing trend in the field of more valuable publications, the proportion of less valuable publications decreases, the qualification structure of faculty staff improves. PhD students are actively involved in project solutions and publish in renowned database journals with regard to quartiles, the faculty carries out activities in the field of popularization of achieved results and visibility in national and international forums and events.

The long-term objective of the Technical University defines in the field of Scientific research, creative and artistic activity the strategic goal of internationally accepted results in research and artistic activity and the transfer of knowledge into economic and social practice with the following measures:

**2.1** Publish the results of research, creative and artistic activity in the international environment, in particular in indexed renowned international scientific journals.

**Indicator:** Number of publications registered in CCC, Web of Science and SCOPUS per creative employee. Number of the highest quality outputs in artistic creation per creative employee of artistic activity.

**2.2** Strengthen the position of the University in scientific research projects of national and international cooperation.

**Indicator:** Number of grants from international sources addressed, including the amount of financial support per creative employee. Number of grants from domestic sources, including the amount of financial support per creative employee.

**2.3** Identify and support top-notch and excellent scientific research activities and activities at individual faculties.

**Indicator:** Number of top and excellent scientific research teams.

**2.4** Build research infrastructure, including qualified operators.

Indicator: Financial value and outputs of research infrastructure. Number of creative staff and students using units of research infrastructure.

**2.5** Deepen the involvement of PhD students in research, creative and artistic activities, subject to publication in indexed renowned international scientific journals.

**Indicator:** Number of publications registered in CCC, Web of Science and SCOPUS per phD graduate.

**2.6** Build and ensure the efficient operation of a technology transfer centre with an emphasis on the commercialisation of research results.

**Indicator:** Number of contracts for scientific research activities and the financial value of revenues from research and development projects per creative employee. The number of patents, utility models and designs per creative employee.

**2.7** To popularise and raise the profile of the results of the university's scientific research and other creative activities in the professional public.

**Indicator:** Number of international and national scientific and professional events organised.

# SCIENTIFIC AND RESEARCH PROFILE Facultures of technology

The basic platform of profiling of the Faculty of Technology in Science and Research is activities in the context of its long-term intention. They represent the area of creation and protection of the working and environmental environment, as well as techniques for the protection of the environment from the negative effects of production processes, in the field of production technology with a focus on forestry and mobile technology, in woodworking machinery and equipment, in the management of machines and equipment, in industrial engineering and management with a focus on safety engineering and in the field of technical provision of production activity. An essential starting point for the focus of the scientific and research profile of FT is the know-how of the faculty, its personnel capabilities and material and technical base. In the above areas of science and research, the activity of the faculty in the submission of grant and scientific research projects is oriented. The financial envelope of scientific research tasks is mainly implemented through grant projects VEGA, KEGA, IPA and APVV. The largest part of the scientific research capacity of the faculty's staff and PhD students is used to solve the projects of the above-mentioned grant agencies.

## Orientation and supporting directions of research

The scientific and research profile of the faculty is based on the professional focus and mission of the faculty, which was reflected in the main directions of science and research at the FT. The scientific and research activities of FT are built on the principle of maximum interconnectedness of pedagogical and scientific activities, respecting global trends and current transfer of knowledge into economic and social practice.

The content focus of the faculty's research activities is oriented to the main directions of research in the field of development and assessment of the quality of forestry and woodworking machines, reduction of material and energy intensity, use of new energy resources (permanently renewable resources, biomass), quality management of production enterprises.

The concept of FT's development objectives is based on the intentions of the development of science and technology in terms of world trends and the needs of society. The aim is also to ensure the uniform development of all accredited fields of study of the faculty and professional disciplines provided by individual departments.

The faculty will develop a long-term program of science and research for the modernization of the production base in the engineering, woodworking, forestry industries and for the development and improvement of environmental facilities. This will take into account the requirements of society and will be based on the needs of innovation in the teaching subjects of the faculty's fields of study. The strategy of FT TU in Zvolen is also aimed at developing contacts with universities in European countries in the form of bilateral agreements on scientific and research cooperation and student exchange. This opens up the potential and balance of research and teaching into a form of consistency between the orientation of research activity and accredited study programmes.

## Main areas and orientations of scientific research activity

The mission of the Faculty of Technology is to develop creative scientific research and, on its basis, to provide higher education in all three levels of study in the Slovak and European research and educational space.

In the field of research, the faculty fulfills its mission by solving research projects and programs of a national and international nature, especially in the areas of agricultural and forestry sciences, engineering and technology, environmental sciences and ecology, engineering and management, human protection and integrated safety, as well as other related and application areas. Based on theD-term intention of the TEhnica University in Zvolen for 2017-2023 with a vision for 2030, the focus of scientific research activities is mainly concentrated on:

* techniques and technologies in the field of waste and secondary raw materials management,
* secondary and renewable energy sources,
* research into water and air protection techniques,
* machinery and mechanisms for woodworking and forestry technology,
* measuring and control systems with microcomputers and modular computer systems,
* use of traditional and special construction and tool materials,
* technological problems with an emphasis on the possibilities of implementing CA – technologies,
* production management, quality management, diagnostics and operational reliability of machines in relation to the environment,
* creation and management of production systems,
* integration of management systems and certification procedures.

To fulfill the mission of the faculty and its long-term intention, the following measures are defined:

* publish the results of research and creative activities in the international environment, in particular in indexed renowned international scientific journals,
* strengthen the faculty's position in scientific research projects of national and international cooperation,
* build research infrastructure, including qualified operators,
* deepen the involvement of PhD students in research, subject to publication in indexed international scientific journals,
* build and ensure the effective dissemination and commercialisation of research results through a university technology transfer centre,
* to popularize and raise the profile of the results of scientific research and other creative activities of the faculty of professional public.

# ORGANIZATIONAL, PERSONNEL, FINANCIAL AND MATERIAL – TECHNICAL PROVISION OF SCIENCE AND TECHNOLOGY

## Scientific research capacity of FT and its qualification structure

The scientific research capacity consists of scientific, pedagogical and researchers. PhD students or students – diplomats are also involved in the scientific research capacity of FT and in solving research tasks.

It is recommended to base the planning of scientific research capacities on the following values:

|  |  |  |
| --- | --- | --- |
| pedagogical staff |  | 1000 h |
|  |  |  |
| internal PhD students | 1st year of study | 1000 h |
| 2nd year of study | 1500 h (max. 2000 h) |

The numbers and structure of the faculty staff constituting the basic scientific research capacity are shown in Table 2.1.

Table 2. 1 Qualification structure of FT staff by workplace as at 31.12.2020

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Workplace | C o u n c il a t i on o f the | | | | Together | Of the total | |
| scientific and pedagogical staff | | | VVz |
| Prof. | .doc. | Oa | DrSc., Dr. | CSc., PhD. |
| KELT | 0 | 2 | 3 | 1 | 6 | 0 | 5 |
| KMSD | 0 | 3 | 3 | 0 | 6 | 0 | 6 |
| KVAT | 2 | 3 | 4 | 0 | 9 | 0 | 9 |
| KVTMKv | 0 | 5 | 0 | 1 | 6 | 0 | 6 |
| TOGETHER | 2 | 13 | 10 | 2 | 27 | 0 | 27 |

Figure 2. 1 Qualification structure of FT staff as at 31.12.2020

The research capacity deployed to solve all research tasks is presented in Table 2.2. The total capacity was shared by one researcher at KVTMKv with a number of hours of 2000 in solving the APVV project and 1 researcher at the CELT. On average, 1,060 hours are spent per 1 reported pedagogical or researcher of FT .

Table 2. 2 Research capacity of teaching staff and VVz FT on scientific projects in classes in 2020

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Workplace | VEGA | KEGA | APVV | IPA and others | Together |
| KELT | 5300 | 1600 | 0 | 660 | 7560 |
| KMSD | 2650 | 4800 | 650 | 120 | 8220 |
| KVAT | 2000 | 2050 | 300 | 0 | 4350 |
| KVTMKv | 3600 | 200 | 4700 | 0 | 8500 |
| Together | 13550 | 8650 | 5650 | 780 | 28630 |

Doctoral students are also involved in solving research tasks. Their research capacities are shown in Table 2.3.

Table 2. 3 Solver capacity of phD students of FT on grant and other scientific projects in classes in 2020

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Workplace | VEGA | KEGA | APVV | Ipa | Together |
| KELT | 5200 | 0 | 0 | 500 | 5700 |
| KMSD | 1000 | 300 | 0 | 0 | 1300 |
| KVAT | 300 | 0 | 0 | 0 | 300 |
| KVTMKv | 0 | 0 | 300 | 100 | 400 |
| Together | 6500 | 300 | 300 | 600 | 7700 |

For one phD student at FT, the research capacity is 770 hours.

## Thematic concentration and financial provision of research on FT

In basic and applied research, the faculty focused on tasks and projects that will significantly contribute to minimizing the negative impacts of technology and technology on the living and working environment and reducing the material and energy intensity of equipment. A significant part of the research capacities are focused on research and development of new machinery and equipment for forestry and the timber industry.

The funds were obtained in the form of approved and solved grant projects, for which the main investigator of the project was fully responsible, in full respect of the Decree of the Ministry of Education of the Slovak Republic on the use of budgetary funds.

A summary overview of the funds allocated to the solution of grant and scientific and technical projects by department is given in Tables 2.4 and 2.5, graphically shown in Figure 2.2. A more detailed overview of the allocations for individual projects is given in Chapter 6.

Table 2. 4 Departments allocated in 20 20 for VEGA and KEGA projects (in EUR)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Workplace | VEGA | | KEGA | | Together |
| Capital | Common | Capital | Common |
| KELT | 0 | 27 122,- | 0 | 456,- | 27 578,- |
| KMSD | 0 | 0 | 0 | 5 711,- | 5 711,- |
| KVAT | 0 | 0 | 0 | 6 005,- | 6 005,- |
| KVTMKv | 0 | 10 312,- | 0 | 0 | 10 312,- |
| Together | 0 | 37 434,- | 0 | 12 172,- | 49 606,- |

Table 2. 5 Departments allocated in 20 20 to APVV projects, institutional research, IPA (in EUR)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Workplace | APVV | | Ipa | | Institutional research | Together |
| Capital | Common | Capital | Common | Common |
| KELT | 0 | 0 | 0 | 811,- | 0 | 811,- |
| KMSD | 0 | 0 | 0 | 0 | 0 | 0 |
| KVAT | 0 | 0 | 0 | 0 | 0 | 0 |
| KVTMKv | 0 | 100 205,- | 0 | 0 | 0 | 100 205,- |
| Ft | 0 | 0 | 0 | 0 | 6 807,- | 6 807,- |
| Together | 0 | 100 205,- | 0 | 811,- | 6 807,- | 107 823,- |

Figure 2. 2 Overview of funds allocated to project solutions by department

Figure 2.3 gives an overview of the volume of allocated funds from the Ministry of Education of the Slovak Republic and funds from other programs.

Figure 2. 3 Overview of the volume of funds allocated to address projects (in EUR)

Figure 2.4 shows the evolution by volume of funding allocated to grant and other projects in 2016-2020.

Figure 2. 4 Project allocations in 2016-20 20

# publishing activity

## Evaluation of employees' publishing and citation activities

The basic form of outputs of scientific research and creative activity is publishing and artistic activity, which was evaluated in accordance with Directive No. 13/2008-R on bibliographic registration and categorization of publishing activity and decree of the Ministry of Education of the Slovak Republic No. 456/2012 Coll. on the central register of records of publishing activity and the central register of records of artistic activity.

Table 3.1 and Figures 3.1 and 3.2 represent the publishing activity followed by individual departments as well as the years 2016 to 2020 at the faculty. The overall publishing performance of FT and its quality of publications is evaluated through categories A1 to D. It can be concluded that the publishing activity of the faculty in 2020 was oriented towards those categories (B and C) that have a positive effect on the allocation of subsidies and the professional growth of employees.

Tables 3.1, 3.2 and the following graphs were drawn up from the departments' documents and according to the documents from the SLDK. The individual categories were determined according to the criteria of the Ministry of Education of the Slovak Republic and took into account the proportions of individual authors. This breakdown is important from the point of view of allocating funds to TU and FT, with priority being given to subsidy categories. Based on the evaluation of publishing activity, it can be concluded that the share of categories A1, A2 has decreased slightly compared to previous years. In category B, publishing activity decreased compared to the previous evaluation period. There has been an increase in the number of publications in category C. According to the current criteria, it is necessary to focus intensively on these types of publications in relation to the subsidy system of the Ministry of Education of the Slovak Republic, i.e. to give preference to publication in journals classified in Q1 and Q2 according to the JCR. From a global perspective, FT must maintain the trend of an increase in publishing outputs per creative worker, especially in categories B and C, and in terms of professional growth also in categories A1 and A2.

Table 3. 1 Evaluation of publishing activities for individual departments according to the criteria of the Ministry of Education of the Slovak Republic for the year 2020 – employees

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Workplace | | A1 | A2 | B | C | D |
| KELT | Together | 0,60 | 1,00 | 1,45 | 1,50 | 14,11 |
| Average per person | 0,12 | 0,20 | 0,29 | 0,30 | 2,82 |
| KMSD | Together | 1,3 | 1,00 | 1,90 | 1,10 | 7,06 |
| Average per person | 0,16 | 0,13 | 0,24 | 0,14 | 0,88 |
| KVAT | Together | 0 | 0 | 2,11 | 2,19 | 11,20 |
| Average per person | 0 | 0 | 0,23 | 0,24 | 1,24 |
| KVTMKv | Together | 0,00 | 1,2 | 1,90 | 7,45 | 5,41 |
| Average per person | 0 | 0,20 | 0,32 | 1,24 | 0,90 |
| Ft | Together | 1,90 | 3,20 | 7,36 | 12,24 | 37,78 |
| Average per person | 0,07 | 0,11 | 0,26 | 0,44 | 1,35 |

Note. 1:Group A1Book publications of the nature of a scientific monograph

Group A2Other book publications

Group BPublications in peer-reviewed scientific journals and copyright certificates, patents and discoveries

Group CPublications in journals that are not peer-reviewed but are registered in WoS or Scopus databases

Group OTHER PUBLICATIONS

Figure 3. 1 Evaluation of publishing activity in shares for individual departments according to the criteria of the Ministry of Education of the Slovak Republic for the year 2020 – employees

Figure 3. 2 Comparison of the development of the number of outputs of employees in individual categories of publishing activity according to the criteria of the Ministry of Education of the Slovak Republic

Figure 3. 3 Comparison of the development of the number of outputs of employees and PhD students in individual categories of publishing activity according to the criteria of the Ministry of Education of the Slovak Republic

Figure 3.4 shows the number of outputs in periodicals assigned quartile in WoS according to the currently available JCR (for 2019). The number of publications included in Q1 and Q2 needs to be increased in the following, since the methodology for allocating subsidies in the field of science and research for publishing results in periodical journals continues to be based on these scientometric data.

Figure 3. 4 Number of outputs in periodicals by quartiles

Table 3.2 lists the copyright certificates, patents and discoveries that were published in 2020 and whose authors or members of the authors' collective were workers of FT. A total of 6 outputs in this category were published (7 in 2019).

Table 3. 2 Copyright certificates, patents and discoveries of FT workers for the year 2020

|  |  |  |
| --- | --- | --- |
| Species  Number | TITLE | NAME OF THE DESIGNER |
| Patent application  120-2018 | Stabilization method for mobile robots | Kuric, Ivan - Pivarčiová, Elena - Sagová, Zuzana - Božek, Pavol - Škultéty, Emil |
| Patent application  109-2018 | Special motor vehicle for rescue work | Božek, Paul - Abramov, Ivan Vasilievich - Pivarchi, Elena - Abramov, Andrei Ivanovich |
| Patent application  130-2018 | Automated system for recording the presence of persons | Božek, Pavol - Pivarčiová, Elena - Kuric, Ivan - Karrach, Ladislav - Więcek, Dariusz |
| Patent  288799 | Detonation assembly for the initiation of energetic substances with a mechanical impulse and equipment for initiating the detonation decomposition of energy substances | Štibrányi, Ladislav - Bachratý, Michal - Javorek, Ľubomír |
| Utility model  155-2019 | The mechanism of longitudinal chipping of cutouts and feeding of firewood in the mobile line | Vargovská, Maria - Matejov, Andrei - Helexa, Milan |
| Trademark  250941 | Logo of student activities at FEVT | Kvočka, Stanislav |

Table 3.3 shows the H-index of FT executives by WoS Core Collection database and Scopus database.

Table 3. 3 H-index of creative employees of FT as of 10.02.202 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEPARTMENT | NAME, TITLE | ENLISTMENT | WoS Core Collection | | | | Scopus | |
| 2017 | 2018 | 2019 | 2020 | 2019 | 2020 |
| KELT | Brodnianská, Zuzana, Ing. PhD. | odb. as. with CSc./PhD. | 1 | 1 | 2 | 3 | 3 | 3 |
| Helexa, Milan, Ing. PhD. | odb. as. with CSc./PhD. | 0 | 0 | 0 | 0 | 1 | 2 |
| Kováč, Ján, doc. Ing. PhD. | associate professor with CSc./PhD. | 2 | 2 | 2 | 3 | 4 | 4 |
| Krilek, Jozef, doc. Ing. PhD. | associate professor with CSc./PhD. | 1 | 2 | 2 | 3 | 3 | 4 |
| Kuvik, Tomáš, Ing. PhD. | odb. as. with CSc./PhD. | 0 | 1 | 2 | 2 | 1 | 1 |
| Melicherčík, Ján, Ing. PhD. | HEI,DrSc.CSc.PhD. vz | - | - | - | 0 | - | 0 |
| KMSD | Beňo, Pavel, doc. Ing. PhD. | associate professor with CSc./PhD. | 1 | 1 | 2 | 2 | 3 | 3 |
| Bodnár, Ferdinand, doc. Ing. CSc. | associate professor with CSc./PhD. | 1 | 1 | 1 | 2 | 1 | 1 |
| Hnilicová, Michaela, Ing. PhD. | odb. as. with CSc./PhD. | 0 | 0 | 1 | 1 | 3 | 5 |
| Kučera, Marian, doc. Ing. PhD. | associate professor with CSc./PhD. | 2 | 2 | 2 | 4 | 7 | 8 |
| Kotšmíd, Stanislav, Ing. PhD. | HEI,DrSc.CSc.PhD. vz | 0 | 0 | 1 | 1 | 1 | 1 |
| Matej, Jaroslav, Ing. PhD. | odb. as. with CSc./PhD. | 1 | 1 | 2 | 2 | 4 | 3 |
| Minárik, Marian, PhD. | odb. as. with CSc./PhD. | 0 | 0 | 1 | 1 | 0 | 1 |
| Turis, Ján, Ing. PhD. | odb. as. with CSc./PhD. | 0 | 0 | 0 | 1 | 2 | 2 |
| KVAT | Barcík, Štefan, prof. Ing. CSc. | professor with CSc./PhD. | 8 | 9 | 11 | 11 | 10 | 10 |
| Hrčková, Maria, PhD. | odb. as. with CSc./PhD. | 0 | 0 | 1 | 1 | 1 | 1 |
| Javorek, Ľubomír, doc. Ing. CSc. | associate professor with CSc./PhD. | 2 | 2 | 2 | 3 | 3 | 3 |
| Koleda, Pavol, Ing. PhD. | odb. as. with CSc./PhD. | 0 | 1 | 2 | 2 | 1 | 1 |
| Koleda, Peter, Ing. PhD. | odb. as. with CSc./PhD. | 0 | 2 | 4 | 5 | 2 | 4 |
| Naščák, Ľubomír, doc. Ing. CSc. | associate professor with CSc./PhD. | 1 | 1 | 1 | 1 | 1 | 2 |
| Pivarčiová, Elena, prof. Mgr. PhD. | Professor with CSc./PhD. | 2 | 3 | 3 | 5 | 6 | 7 |
| Svoreň, John, doc. Ing. CSc. | associate professor with CSc./PhD. | 1 | 2 | 3 | 3 | 3 | 3 |
| Vargovská, Maria, PhD. | odb. as. with CSc./PhD. | 0 | 0 | 1 | 1 | 1 | 1 |
| KVTMKv | Black, Helena, doc. Ing. PhD. | Associate Professor with CSc./PhD. | 0 | 0 | 2 | 3 | 4 | 4 |
| Dado, Miroslav, doc. Ing. PhD. | associate professor with CSc./PhD. | 1 | 2 | 2 | 4 | 4 | 4 |
| Hnilica, Richard, doc. Ing. PhD. | associate professor with CSc./PhD. | 2 | 2 | 2 | 4 | 4 | 4 |
| Sujová, Erika, doc. Ing. PhD. | Associate Professor with CSc./PhD. | 1 | 2 | 2 | 3 | 4 | 4 |
| Ťavodová, Miroslava, doc. Ing. PhD. | Associate Professor with CSc./PhD. | 0 | 1 | 2 | 3 | 5 | 6 |

Table 3.4 shows the assessment of the citation activity of staff by departments of the faculty divided into categories:

1 - In foreign publications registered in the Web of Science and the Scopus database,

2 - In domestic publications registered in the Web of Science and the Scopus database,

3 - In foreign publications not registered in the Web of Science and the Scopus database,

4 - In domestic publications not registered in the Web of Science and the Scopus database.

Table . Evaluation of citation activities for individual departments for 2020 – staff

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Department | | 1 | 2 | 3 | 4 |
| KELT | Together | 16 | 2 | 1 | 7 |
| average per person (5) | 3,20 | 0,40 | 0,20 | 1,40 |
| KMSD | Together | 21 | 1 | 2 | 12 |
| average per person (8) | 2,63 | 0,13 | 0,25 | 1,50 |
| KVAT | Together | 71 | 11 | 7 | 9 |
| average per person (9) | 7,89 | 1,22 | 0,78 | 1,00 |
| KVTMKv | Together | 38 | 2 | 12 | 4 |
| average per person (6) | 6,33 | 0,33 | 2,00 | 0,67 |

## Evaluation of publication and citation activities of PhD students

In particular, the publishing and citation activities of doctoral students of the departments for the year20 20, which is presented in Tables 3.5 and 3.6 and Figure 3, were evaluated at the Faculty of Technology of the University in Zvolen. 4. Increasing the publication activity of PhD students is one of the indicators of fulfillment of the long-term goal of TUZVO for the years 2017 - 2023.

Table 3. 5 Evaluation of publishing activities for individual departments according to the criteria of the Ministry of Education of the Slovak Republic for the year 2020 – phD students

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Workplace | | A1 | A2 | B | C | D |
| KELT | Together | 0 | 0 | 0,75 | 0,3 | 5,97 |
| average per person | 0,00 | 0,00 | 0,13 | 0,05 | 1,00 |
| KMSD | Together | 0 | 0 | 0,1 | 0,2 | 0,8 |
| average per person | 0 | 0 | 0,13 | 0,05 | 1,00 |
| KVAT | Together | 0 | 0 | 1,08 | 0,83 | 1,1 |
| average per person | 0 | 0 | 0,27 | 0,21 | 0,28 |
| KVTMKv | Together | 0 | 0 | 0 | 0,1 | 0 |
| average per person | 0 | 0 | 0,80 | 0,45 | 1,55 |
| Ft | Together | 0,00 | 0,00 | 1,93 | 1,43 | 7,87 |
| Average per person | 0,00 | 0,00 | 0,13 | 0,10 | 0,52 |

Figure 3. 5 Evaluation of the publication outputs of PhD students for individual departments

Table 3.6 shows the assessment of the citation activity of PhD students by departments of the faculty in the categories:

1 - In foreign publications registered in the Web of Science and the Scopus database,

2 - In domestic publications registered in the Web of Science and the Scopus database,

3 - In foreign publications not registered in the Web of Science and the Scopus database,

4 - In domestic publications not registered in the Web of Science and the Scopus database.

Table 3. 6 Evaluation of citation activities for individual departments for the year 2020 – PhD students

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Workplace | | 1 | 2 | 3 | 4 |
| KELT | Together | 0 | 0 | 0 | 4 |
| average per person | 0,00 | 0,00 | 0,00 | 0,67 |
| KMSD | Together | 0 | 0 | 0 | 1 |
| average per person | 0,00 | 0,00 | 0,00 | 1,00 |
| KVAT | Together | 7 | 2 | 4 | 1 |
| average per person | 1,40 | 0,40 | 0,80 | 0,20 |
| KVTMKv | Together | 2 | 0 | 1 | 2 |
| average per person | 0,67 | 0,00 | 0,33 | 0,67 |

## Evaluation of implementation activities

In Table 3.7 and Figures 3. 6 and 3. 7 is an overview of the implementation, management and organizational activities of individual departments of FT for the2020 assessment year in categories:

A. Implementation activity,

B. Management and organisational activities in the field of science and technology,

C. Assessment activity.

Table 3. 7 Scoring of the activities of FT departments in individual categories for the year 2020

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Workplace | | A | B | C |
| KELT | Together | 6,2 | 6 | 27 |
| average per person | 1,0 | 1 | 4,5 |
| KMSD | Together | 3,5 | 26 | 28 |
| average per person | 0,6 | 4,3 | 4,7 |
| KVAT | Together | 13 | 33 | 86 |
| average per person | 1,625 | 4,125 | 10,75 |
| KVTMKv | Together | 3 | 16 | 22 |
| average per person | 0,4 | 2,3 | 3,1 |
| FT | Together | 26 | 81 | 163 |
| Average per person | 0,86 | 2,70 | 5,43 |

Figure 3. 6 Evaluation of the activities of departments in individual categories for the year 2020

Figure 3. 7 Evaluation of FT's activity in each category for the years 2018 to 2020

# scientific and professional events

Name of department: **KELT**

Title of the event: Colloquium to the grant task VEGA No. 1/0642/18 Analysis of the impact of structural parts of forestry mechanisms in the forest environment from an energy and ecological point of view.

Type of event: Conference.

Date of the event: 8.12.2020

Expert guarantor: Ján Kováč, PhD.

Number of participants: home: 10

Focus of the event:The event focused on the field of technologies for reducing energy intensity and increasing the service life of cutting tools used in the mechanisms of forestry machines and research on the effect of the forestry machine on the forest environment.

Title of the proceedings: Colloquium to the grant task VEGA No. 1/0642/18 Analysis of the impact of structural parts of forestry mechanisms in the forest environment from an energy and ecological point of view.

Name of department: **KVAT**

Event name: RoboPlay 2020: competitive robot show for primary schools

Type of event: robot competition

Date of the event: 28.1.2020

Expert guarantor: Prof. Mgr. Elena Pivarčiová, PhD.

Number of participants: home: 11 teams (26 competitors + 9 supervision), 32 guests

Focus of the event: robotics

Name of department: **KVAT**

Event name: RoboPlay 2020: robot competition for high school and university students TUZVO

Type of event: robot competition

Date of the event: 30.1.2020

Expert guarantor: Prof. Mgr. Elena Pivarčiová, PhD.

Number of participants: home: 8 teams (19 competitors + 5 supervision), 29 guests

Focus of the event: robotics

**FT**

Event name: Open Day

Type of event: professional presentations

Event date: 06.02.2020

Expert guarantor: doc. Ing. Pavel Beňo, PhD.

Number of participants: domestic: 150, foreign: 0

Focus of the event: The aim of the event was to present the possibilities of studying at FT and to demonstrate modern technologies used in teaching.

# achieved results in solving science and technology projects

## Grant projects VEGA, KEGA

In 2020, creative employees of the Faculty of Technology were the principal investigators of 4 VEGA projects (tab. 5.1) and 2 KEGA projects (tab. 5.2). At the same time, employees were involved in solving 2 VEGA and 2 KEGA projects, where there were responsible investigators from other faculties or universities.

Table 5. 1 Solved VEGA projects at the Faculty of Technology in 2020

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project number | Project name | Principal investigator | Workplace | Solution time | Prid. Fin. (€) | |
| Bv | Kv |
| 1/0642/18 | Analysis of the impact of structural parts of forestry mechanisms in the forest environment in terms of energy and ecological | Doc. Ing. Ján Kováč, PhD. | KELT | 2018-03/2021 | 6 400,- | 0 |
| 1/0086/18 | Research of temperature fields in a system of shaped heat exchange surfaces | Prof. Mgr. Elena Pivarčiová, PhD. | KELT  KVAT | 2018-2021 | 8 872,- | 0 |
| 1/0019/19 | Predictive models of solid aerosol contamination of working air in mechanical wood processing | Doc. Ing. Miroslav Dado, PhD. | KVTMKv | 2019-2022 | 10 312,- | 0 |
| 1/0609/20 | Research on cutting tools in the processing of dendromasa from agricultural and forestry production | Doc. Ing. Jozef Krilek, PhD. | KELT | 2020-2023 | 11 850,- | 0 |
| 1/0556/19 | Lightweight wood materials based on veneers and their application in products | .doc. Ing. Jozef Gáborík, CSc.  Ing. Marián Minárik, PhD. | DF  KMSD | 2019-2021 | 0 | 0 |
| 1/0155/18 | Applied research on the use of ecological energy carriers in agricultural, forestry and transport technology | .doc. Ing. Ľubomír Hujo, PhD.  Ing. Ján Turis, PhD. | SPU in Nitra  KMSD | 2018-2021 | 0 | 0 |
| Together | | | | | 37 434,- | 0 |

Table 5. 2 Solved KEGA projects at the Faculty of Technology in 2020

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project number | Project name | Principal investigator | Workplace | Solution time | Prid. Fin. (€) | |
| Bv | Kv |
| 015TU Z-4/2019 | Progression and application of educational methods in the field of body mechanics | Ing. Marián Minárik, PhD. | KMSD | 2019-03/2021 | 4 646,- | 0 |
| 005TU Z-4/2018 | Building a progressive machining CNC workplace for innovation of forms of teaching in study programs at the Faculty of Technology | Doc. Ing. Peter Koleda, PhD. | KVAT | 2018-03/2021 | 6 005,- | 0 |
| 012SPU-4/2020 | Innovation of the educational process and implementation from practice with a focus on winemaking and viticulture | Prof. Ján Jobbágy, PhD.  doc. Ing. Ján Kováč, PhD. | SPU in Nitra  KELT | 2020-2022 | 456,- | 0 |
| 028SPU-4/2019 | Practical use of knowledge of designing and testing transmission systems of hydraulic mechanisms of mobile agricultural and forestry technology | .doc. Ing. Ľubomír Hujo, PhD.  Doc. Ing. Marián Kučera, PhD. | SPU in Nitra  KMSD | 2019-2021 | 1 065,- | 0 |
| Together | | | | | 12 172,- | 0 |

*VEGA grant projects – completed*

**VEGA 1/0642/18 Analysis of the impact of structural parts of forestry mechanisms in the forest environment from the point of view of energy and ecological**

Doc. Ing. Ján Kováč, PhD.

Further knowledge was obtained in the database of basic parameters of the transverse division of wood, depending on the cutting conditions and physico-mechanical properties of wood. The technical parameters of adapters for the processing of biomass – mining waste for energy purposes have been determined. In the field of research on the interdependencies between the mobile forest machinery and the soil in terms of ecological and energy, the requirements for the running mechanism have been defined. The project focused on theoretical analysis and experimental verification of forestry adapters in wood and biomass processing in order to determine their optimal parameters in the machine-tool-object system of work, to determine the cutting conditions, durability of the cutting edge and the durability of tools, as well as to analyze the shapes of cutting tools. Research on interdependencies between the running systems of mining equipment with land from an energy and ecological point of view.

*VEGA grant projects – ongoing*

**VEGA 1/0086/18, Research of temperature fields in a system of shaped heat exchange surfaces.**

Prof. Mgr. Elena Pivarčiová, PhD.

During the third year of the project solution, the researchers published 5 outputs related to the project, including 2 scientific papers in foreign peer-reviewed journals and 3 inscientific papers in a domestic journal.

**VEGA 1/0019/19 Predictive Models of Solid Aerosol Contamination of Working Air in Mechanical Wood Processing**

doc. Miroslav Dado, PhD. (KVTMK)

Based on the results of experimental measurements, empirical models were created taking into account the significance of the influence of individual input factors (type of grinder, graininess of the abrasive, size of the thrust force, density of the cut wood) and their interactions on the size of the output factors (mass concentration and size composition of wood dust).

**VEGA No.**  **1/0609/20 - Research on cutting tools in the processing of dendromasa from agricultural and forestry production.**

doc. Ing. Jozef Krilek, PhD.

The main objective of the project is based on reducing the energy requirements of the wood division process and obtaining data that will lead us to a deeper knowledge of the influencing technical-technological parameters in the process of dividing the dendromasa using different kinds of dividing mechanisms. The influence of wood properties in the interaction process of wood division and initial processing in terms of wood species, its anisotropy, humidity, technical-technological factors and forestry technology will be monitored, following the energy intensity of the process. During the first year of the solution, initial analyses and experimental measurements were carried out, where the results are published: 1 scientific article in CCC, 2 articles in WOS. The results were published and presented at the TECHNOFÓRUM conference and at the 46th International Scientific Conference of the Departments of Transport, Handling, Construction and Agricultural Technology: under the auspices of Prof. Dr. Milan Saga, Dean of the Faculty of Mechanical Engineering of the University of Žilina.

*Ongoing VEGA projects from other locations*

* Ján Svoreň, CSc., doc. Ľubomír Javorek, CSc., Marián Minárik, PhD. – **VEGA 1/0556/19 Lightweight wood materials based on veneers and their application in products** (doc. Jozef Gáborík, CSc., DF)
* Ján Turis, PhD. – **VEGA 1/0155/18 Applied research on the use of ecological energy carriers in agricultural, forestry and transport technology** (doc. Ľubomír Hujo, PhD., TF SPU Nitra)

*KEGA grant projects completed*

**KEGA 015TU Z-4/2019, Progression and application of educational methods in the field of body mechanics** By Marián Minárik, PhD.

The project is intended to support the teaching of issues in the field of mechanics with the aim of improving the quality of education in this area, where a procedure for expanding the base of study materials for teaching in this area is proposed. A corpus of literature has been compiled, which is continuously processed and supplemented in order to extend modern educational methods into the current teaching of subjects of a technical nature and thus improve the conditions that allow students to visually follow the online activity of mechanical systems. Classrooms equipped with new teaching aids

**KEGA 005TU Z-4/2018 Building a progressive CNC machining workplace for innovation of forms of teaching in study programs at the Faculty of Technology**

doc. Ing. Peter Koleda, PhD.

The project was aimed at strengthening the teaching of CNC programming at the Faculty of Technology with an emphasis on the creation of an NC program and machining simulation in CAM software. In the last year of the solution, 3D CND milling machines with the 4th axis were purchased – filming the workpiece, tools for these milling machines. The results achieved in the introduction of the new subject were presented at the Innovation in Forest Industry and Engineering Design conferences (Sofia, Bulgaria) and the 12th World Conference on Education Sciences (Istanbul, Turkey), together with publication in the proceedings of them (New Trends and Issues Proceedings on Humanities and Social Sciences) and in the scientific journal of the Faculty of Forestry of the University of Forestry in Sofia Innovation in Woodworking Industry and Engineering Design No. 2/2020. At the end of the project solution, scripts for the subject will be issued. *Completed KEGA projects from other workplaces*

*KEGA grant projects continuing*

*Ongoing KEGA projects from other workplaces*

**KEGA 012SPU-4/2020 Innovation of the educational process and implementation from practice with a focus on winemaking and viticulture.**

Prof. Ján Jobbágy, PhD. – SPU Nitra

doc. Ing. Ján Kováč, PhD.

The main goal of the project is to prepare quality graduates in all three levels of study in the field studied in the future. For new subjects, new study materials and didactic aids will be created. In pedagogical documents, key competences represent long-term goals. These need to be transformed, unpacked, applied into specific goals, associated with the curriculum and other means to develop the individual needs of the school, students and practice.

**KEGA 028SPU-4/2019, Practical use of knowledge of designing and testing transmission systems of hydraulic mechanisms of mobile agricultural and forestry technology.**

doc. Ing. Ľubomír Hujo, PhD. SPU Nitra

doc. Ing. Marián Kučera, PhD.

## APVV projects

Table 5. 3 APVV projects solved at the Faculty of Technology in 2020

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number | Title | Principal investigator | Workplace | Good solutions | Prid. Fin. (€) | |
| Bv | Kv |
| APVV-16-0194 | Research on the impact of production process innovations on the durability of tools and components of forest mechanisms | Richard Hnilica | KVTMKv | 2017-2020 | 72 178,- | 0 |
| APVV-17-0400 | Strengthening the ethical environment in Slovakia (institutional processes, actors, risks, strategies) | Helena Black | KVTMKv | 2018-2022 | 28 027,- | 0 |
| Together | | | | | 100 205,- | 0 |

*APVV projects completed*

**APVV-16-0194 Research on the impact of innovations in production processes on the service life of tools and components of forest mechanisms**

doc. Ing. Richard Hnilica, PhD.

Specific solutions related to working tools (so-called teeth) of shredders of unwanted increases. By evaluating the analyses of mechanical properties, microstructure, mixing quality and cohesion of individual layers of materials as well as the overall quality of weld hard metals, we assume that the best results will be achieved with working tools with hardeners made with HR HAG tubular wire, electrode 53 N and weld electrode E 520 RB. When welding hard metal to selected places on a working tool, it is important to pre-adjust it by grooving it on the most exposed surfaces, and then apply the hard metal by welding. We will provide a technical solution for extending the technological life of road cutter working tools by applying welds with an E DUR 600 and ABRADUR 58 electrode to the functional surfaces of the work tool. Based on laboratory analyses of selected methods of refurbishment of snow lances, we arrived at two technical solutions extending the technological lifespan, namely the solution of a snow blade with a layer of hardener OK 84.58 and the solution of a snow blade, the base material of which is welded with HARDOX 450 material in places most exposed to wear. For pulleys, we have arrived at a technical solution to extend their technological life by applying a hard layer to the pulley profile with a weld electrode ESAB 83.50, which is best suited for use due to the quality of welded deposits, high hardness and good properties in the melting zone. The technical solution for extending the technological life of the branch knife consists in attaching the cutting tool on a rigid shaped jaw at the bottom. Such a design reduces the cost of operating the machine, since it is not necessary to replace the entire branch jaw, but only the cutting edge.

*APVV projects continuing*

**APVV 17-0400 Strengthening the ethical environment in Slovakia (institutional processes, actors, risks, strategies)**

.doc. Helena Čierny, PhD.

The main goal in 2020 was to focus on the presence or absence of ethical elements such as actors and risks and institutional practices of the ethical environment in Slovakia. In the initial phase, we were based on monitoring and subsequent risk assessment of process management in manufacturing companies in the Slovak Republic. In the next phase, using an anonymous survey, we analyzed the ethical environment in selected production companies in the Slovak Republic and, based on the analysis, we designed an algorithm of steps to strengthen the ethical environment of production. enterprises in Slovakia.

*APVV projects from other workplaces*

* Prof. Štefan Barcík, CSc. – **APVV 17-0456 Thermal modification of wood with saturated water vapor in order to purposefully and steadily change the color of wood mass** (prof. Ladislav Dzurenda, PhD., DF)
* Ľubomír Javorek, CSc. – **APVV 16-0177 Progressive modifications of the wood surface, film-forming substances and their interactions at the phase interface** (prof. Jozef Kúdela, CSc.)

## IPA projects and others

Table 5. 4 Solved IPA projects at the Faculty of Technology in 2020

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number | Title | Principal investigator | Workplace | Solution time | Prid. Fin. (€) | |
| Bv | Kv |
| 19/2020 | Research on the cutting mechanism of the cutting head in the field of chipless felling of woody plants | Ing. Pavol Harvánek | KELT | 2020 | 811 | 0 |
| Together | | | | | 811 | 0 |

**IPA No. 19/2020 Research of the cutting mechanism of the cutting head in the field of chipless felling of woody plants.**

Ing. Pavol Harvánek

The aim of the project is to carry out research in the field of chipless wood cutting with the help of a chipless cutting head. The main objective will be to determine the magnitude of the cutting force required to cut the sample in a direction perpendicular to the growth of the woody fibers by different types of cutting tools and to observe the change in the quality of the cut. The goal will be to achieve the lowest possible cutting power without significantly disrupting the structure of the wood.

Due to the complexity of the current situation, it was only partially possible to evaluate the objectives of the project. The research team managed to evaluate the influence of the thickness of the cutting knife in the process of chipless division of wood. Experimental measurements took place in tu workshops on the hydraulic stend of the KELT department, for which it was necessary to design and subsequently produce a preparation for attaching cutting knives of different thicknesses. The design of the preparation and subsequent production, which took place in the TU workshops, made it possible to carry out measurements.

*Other projects*

**UNIVNET – University and industrial research and education platform of the recycling society.**

Dr. h. c. prof. Ing. Rudolf Kropil, PhD.

Doc. Ing. Pavel Beňo, PhD.

Doc. Ing. Jozef Krilek, PhD.

The main goal of the association is foresight and research and development activities in the search for new technologies and techniques for maximum efficient waste recovery, especially in the automotive industry. The aim is to minimise negative environmental impacts and to conserve primary energy and raw material resources. The research task of TUZVO is "Recycling and recovery of rubber, rubber and plastics into new products". The object of research was two types of waste materials: worn-out tires and plastics from passenger cars. During the solution of the research task, the team of investigators was engaged in research and analysis of the materials in question, in order to increase the usability of waste tires and plastics in new products, assess the environmental risk in the temporary storage of used tires, their biodegradability, propose the concept of a business plan for the production of new products, evaluate materials by tertiary and quaternary recycling and design the crusher necessary for the processing of waste plastics and rubber. The results of the research task were published in the professional monograph *State and visions of waste recovery from the automotive industry of the Slovak Republic* and presented at the online conference TOP 2020.

# Student scientific professional activity

The 20th year of the faculty conference of ŠVOČ at FT was not realized in the academic year 2020/2021 due to the pandemic situation, the organizing committee decided to postpone it to 2021.

**Organizing Committee of the ŠVOČ:**

Vice-Dean for VVČ and DŠ: doc. Ing. Peter Koleda, PhD.

Chairman of the Board of ŠVOČ:Ing. Tomáš Kuvik, PhD.

Members of the Board of ŠVOČ: doc. Zuzana Brodnianská, PhD.

Pavol Koleda, PhD.

Roman Bambura

# Scientific journal

In 2020, the 2ndedition of the scientific journal Acta Facultatis Technicae was published in two issues. In issue 1, 10 scientific articles were published, in issue 2 6 scientific articles and 1 paper were published.

The scientific journal Acta Facultatis Technicae has been published by the Technical University of Zvolen in its publishing house since 1997, it is intended for the general scientific and professional public. The journal publishes only **original scientific papers** from the following areas:

* production and automation technology,
* developments in hydraulic elements, systems and fluids used in agricultural, forestry and production technology,
* robotics and informatics,
* energy and environment,
* the quality and reliability of machinery and equipment,
* technique and mechanization of agriculture and forestry,
* technique of production processes,
* the characteristics and processing of agricultural and forestry materials and products,
* marketing of machines and safety of technical systems.

The journal is published in two issues per year and is assigned international standard number ISSN 1336-4472. The deadline for contributions is two times a year – **January 30 and June 30.**  **The papers are published in English.**

**Composition of the editorial board:**

**doc. Pavel Beňo, PhD. – President of RR**

**Prof. Štefan Barcík, CSc. – scientific editor**

**doc. Peter Koleda, PhD. – technical editor**

**Members of the Editorial Board:**

doc. Ing. Miroslav Dado, PhD.

doc. Ing. Ján Kováč, PhD.

doc. Ing. Jozef Krilek, PhD.

doc. Ing. Marián Kučera, PhD.

Prof. Mgr. Elena Pivarčiová, PhD.

doc. Ing. Miroslava Ťavodová, PhD.

# DOCTORAL STUDIES

Doctoral studies at the faculty took place in the academic year 2019/20 20 in one study program Production Engineering in accordance with Act No. 131/2002 on Higher Education Institutions, which since 01.09.2019 is included in the field of study Mechanical Engineering in accordance with Decree No. 244/2019 Coll. on the System of Study Fields of the Slovak Republic.

Table 8. 1 Program doctoral studies at FT

|  |  |
| --- | --- |
| FIELD OF STUDY | STUDY PROGRAMME |
| Mechanical Engineering | Production Engineering |

List of trade union commission members in 2020

**Chair OK**

Prof. Štefan Barcík, CSc.FT TU in Zvolen

**OK members**

|  |  |
| --- | --- |
| doc. Ing. Pavel Beňo, PhD. | FT TU in Zvolen |
| doc. Ing. Ferdinand Bodnár, CSc. | FT TU in Zvolen |
| Dr.h.c. prof. Ing. Pavol Božek, CSc. | MTF Trnava STU Bratislava, |
| doc. Ing. Miroslav Dado, PhD. | FT TU in Zvolen |
| Prof. Peter Demeč, CSc. | Faculty of Mechanical Engineering tu Košice |
| doc. Ing. Jiří Fries, Ph.D. | Faculty of Mechanical Engineering VŠB-TU Ostrava |
| doc. Ing. Richard Hnilica, PhD. | FT TU in Zvolen |
| doc. Ing. Ľubomír Javorek, CSc. | FT TU in Zvolen |
| doc. Ing. Ján Kováč, PhD. | FT TU in Zvolen |
| doc. Ing. Jozef Krilek, PhD. | FT TU in Zvolen |
| doc. Ing. Marián Kučera, PhD. | FT TU in Zvolen |
| doc. Ing. Ľubomír Naščák, CSc. | FT TU in Zvolen |
| Prof. Mgr. Elena Pivarčiová, PhD. | FT TU in Zvolen |
| Prof. Mikuláš Siklienka, PhD. | DF TU in Zvolen |
| doc. Ing. Ján Svoreň, CSc. | FT TU in Zvolen |
| Prof. Jozef Víglaský, CSc. | FT TU in Zvolen |

**Study programme under the responsibility of the trade union committee:**

Production technology

**Headquarters of the trade union commission:**

Faculty of Technology

Technical Universityand Zvolen

Student 26

960 01 Elected

In the past year (as of 31.12.2020), the dissertation examination was successfully passed by 2 phD students in full-time form and 2 studentsalso in part-time form.

Table 8. 2 Successfully passed dissertation exams in 2020 (status as at 31.12.2020)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DEPARTMENT | NAME | TRAINER | BRANCH | DATE | DISSERTATION TITLE |
| KVTMKv | Ing. Roman Bambura | Doc. Ing. Miroslav Dado, PhD. | Production Engineering | 20.05.2020 | Optimization of production processes using the tools of a digital enterprise |
| KELT | Ing. Pavol Harvánek | Doc. Ing. Ján Kováč, PhD. | 20.05.2020 | Research of the cutting mechanism of the cutting head for chipless wood division |
| KELT | Ing. Pavel Ťavoda  (ext.) | Doc. Ing. Ján Kováč, PhD. | 20.05.2020 | Research on the operational reliability of the selected removal vehicle |
| KELT | Ing. Branislav Tichý  (ext.) | doc. Ing. Jozef Krilek, PhD. | 27.08.2020 | Research on the impact of modifying a disc mower tool on its durability |

The dissertation was successfully defended by 4 interní and 1 external doctoral student (tab. 8.3).

Table 8. 3 Successfully conducted dissertation defenses in 20 20 (status as at 31.12.2020)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DEPARTMENT | NAME | TRAINER | BRANCH | DATE | DISSERTATION TITLE |
| KVAT | Ing. Michal Korčok, PhD. | Prof. Ing. Štefan Barcík, CSc. | Production Engineering | 26.08.2020 | Analysis of the impact of thermally modified wood technology on the energy intensity and morphology of surface formation of the machining process |
| KMSD | Ing. Silvia Kopčanová, PhD. | Doc. Ing. Marián Kučera, PhD. | 26.08.2020 | Multiparametric diagnostics of machinery in technical practice |
| KVTMKv | Ing. Veronika Škultétyová, PhD. | Doc. Ing. Richard Hnilica, PhD. | 27.08.2020 | Research on the durability of working tools of mechanisms used in the establishment of forests and the education of forest cover |
| KELT | Ing. Ján Melilcherčík, PhD. | doc. Ing. Jozef Krilek, PhD. | 27.08.2020 | Research on selected factors for the wood sectoring process |
| KVAT | Ing. Ladislav Karrach, PhD.  (ext.) | Prof. Mgr. Elena Pivarčiová, PhD. | 26.08.2020 | Analysis and application of 2D codes in production |

# CONCLUSION

The submitted Report on Scientific Research Activities (SCC) summarizes the results of the SCC and provides basic information about the personnel, technical and financial provision of the faculty's scientific and research work.

The focus of scientific and research activities is in accordance with the professional profiling of the faculty. The scope and effectiveness of SCC is largely determined by external conditions, in particular the lack of financial resources, which, among other things, directly affect the construction of laboratories and their equipment with the necessary technology. It is important that the initiative of the faculty staff is aimed at obtaining grants, projects and other activities to provide financial resources for scientific research activities. In publishing activity, it is necessary to focus on publications in indexed journals with the highest quartile according to the JCR indicator.

Increased attention in this regard must be paid to cooperation with practice and the commercial exploitation of the results of scientific research activities. In this area, scientific and research activity at the faculty is not at the required level compared to previous years.

# DRAFT MEASURES FOR 2021

Based on the Long-Term Development Plan of the Technical University for 2017-2023, the draft measures in scientific research activities are mainly focused on:

1. To maintain the position of the faculty in the scientific community and to develop the research character of the faculty by involving all creative faculty employees in solving domestic and international research projects, especially in the main directions of research.

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Head of Departments

Timeframe: continuous

1. In the field of the structure of scientific research projects, focus on basic and applied research projects in order to achieve a balanced structure of funding of scientific research activities from all available sources. These are mainly EU framework programmes, cross-border cooperation projects, operational programme research and development Agency of the Ministry of Education of the Slovak Republic for EU Structural Funds, or international projects H2020.

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Head of Departments

Timeframe: continuous

1. In the field of presentation of the results of scientific and research activities of the faculty, focus on increasing the quality and frequency of published outputs. Focus especially on the preferred categories, which are the main ones in the faculty's subsidy, evaluation and project processes (priority of the faculty registered with the highest possible IF and the best quartile and A1, A2 registered in WoS). Increasing the CI according to WOS/Scopus and obtaining the attributes of awards of top international quality in the field of technical research.

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Heads of Departments, all creative staff

Timeframe: continuous

1. To combine the research capacities of departments into larger projects with regard to the complex use of the laboratory and instrumental potential of the faculty.

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Head of Departments

Timeframe: continuous

1. Maintain and deepen cooperation with domestic and foreign research and production institutions in order to improve the quality of research results and their commercial use.

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Vice-Dean for Development and External Relations, Head of Departments

Timeframe: continuous

1. Use all available means to improve the image of the faculty in professional circles and the public by presenting the results of scientific research activities.

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Vice-Dean for Development and External Relations, Head of Departments

Timeframe: continuous

1. In the field of building and expanding instrumentation, regularly contribute to the purchase of instruments and equipment from the means to solve projects. Use development projects and all other available options to improve the status quo.

**Responsible:** project leaders

Timeframe: continuous

1. Continue to support the development of student scientific and professional activities and focus on improving the quality of the presented works. To promote ŠVOČ FT at other technical faculties and secondary schools in Slovakia with similar professional profiling.

**Responsible:** Vice-Dean for Science, Research and Doctoral Studies, Head of Departments, President of ŠVOČ

Timeframe: continuous

1. To support the presentation of own scientific and research activities and the possibility of comparing it with the results of other workplaces by organizing international scientific events at the faculty.

**Responsible:** Vice-Dean for Science, Research and Doctoral Studies, Head of Departments, Project Leaders

Timeframe: continuous

1. Orientation of the publishing as well as citation activities of phD students on improving its quality, especially focusing on the preferred categories, on the best possible fulfillment of the criteria for obtaining funds from the subsidy schedule, as well as for the need to meet the criteria of future evaluations of the faculty in the context of the Dean's Methodological Guidance "Rules and requirements for the VT doctoral study program at FT TU in Zvolen. "

**Responsible:** Dean, Vice-Dean for Science, Research and Doctoral Studies, Trainers

Timeframe: continuous