



## PRODUCT DEVELOPMENT AT THE FACULTY OF ENGINEERING UNIVERSITY IN KRAGUJEVAC

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*Abstract: Development of new products is one of the most important activities with which modern companies with a goal to stay competitive on the foreign and domestic market are faced. For achieving this goal it is necessary to have trained personnel in the field of product development.*

*At the Faculty of Engineering at the University of Kragujevac on the study program which is accredited in the period from 2008 to 2012, product development has been studied in specific subjects on various modules and levels of study. Within the accreditation from 2013 a redesign of the module for Mechanical Structures and Mechanization based on examples of some of the best universities from Europe in the field of product development,*

*In the following cycle of accreditation, or if possible before that, it is necessary to find possibilities and define one independent module on the master academic studies (one year or two year) which would completely be dedicated to studying product development.*

*Key words: product development, redesign, Mechanical construction and mechanization*

### 1. INTRODUCTION

Modern companies today are faced with rigorous demands in the field of product development in order to maintain a steady business and be competitive on the market, [1,2,3,4]. For that reason there is a large need for qualified experts with sufficient knowledge in the field of product development. Consequently, the technical faculties have to adapt their study programs to modern requirements of the market [5,6,7,8].

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## **2. STUDY PROGRAMS AT THE FACULTY OF ENGINEERING - 2008 ACCREDITATION**

The Faculty of Mechanical Engineering in Kragujevac, or today the Faculty of Engineering of the University in Kragujevac was founded October 1st 1960 as a section of the Faculty of Mechanical Engineering in Belgrade and started with work on October 9th 1960. The Faculty of Mechanical Engineering in Kragujevac became an independent faculty of the University of Belgrade December 2nd 1971. Since 1976 the Faculty of Mechanical Engineering has been a part of the University "Svetozar Markovic" in Kragujevac, today the University of Kragujevac.

The study program Mechanical Engineering is adapted to the Law of Higher Learning and the Bologna Declaration, at the Faculty of Mechanical Engineering in Kragujevac was formed on May 5th 2006 and was accredited in 2008.

Within the system of higher learning of the Republic of Serbia, at the Faculty of Mechanical Engineering classes are held on three levels, and they are, [9]:

- Bachelor Academic Studies,
- Master Academic Studies, and
- Doctorate Studies.

Classes are held on the following study programs (accredited 2008-2012):

- Mechanical Engineering (basic, master and doctorate studies),
- Military-Industrial Engineering (bachelor and master studies),
- Automotive Engineering (bachelor and master studies),
- Urban Engineering (bachelor studies),
- Engineering Management (master studies),
- Industrial Engineering-Business Informational Systems (master studies).

The Mechanical Engineering study program is in the field of technical-technological sciences and has the following modules:

- Production engineering,
- Mechanical structures and mechanization,
- Motor vehicles and IC engines,
- Energy and process engineering,
- Applied mechanics and automatic control,
- Industrial engineering,
- Informatics in engineering and
- Road traffic engineering

The field of product development at the study programs of the Faculty of Engineering of the University in Kragujevac accredited in the period from 2008 to 2012 is not defined as independent, however it is represented on all modules through various subjects and content. This field is mostly developed on the module for Mechanical Structures and Mechanization.

The department for Mechanical Structures was formed in 1978, and the first students of the module started classes in 1979/80. Later the department grew into the Department for Mechanical Structures and Mechanization, and module along with it.

### 3. REDESIGN OF THE MODULE MECHANICAL STRUCTURES AND MECHANIZATION - ACCREDITATION 2013

Keeping in mind the timeliness of the topic of product development and the needs to have the study programs at the Faculty of Engineering of the University of Kragujevac adapted to the needs of the market, the Faculty Board has shown a wish to take certain measures and activities in this direction for the reaccreditation of study programs in 2013. Regarding the new tendencies the Faculty of Engineering is a partner on the TEMPUS project named IMPROVEMENT OF PRODUCT DEVELOPMENT STUDIES IN SERBIA AND BOSNIA AND HERZEGOVINA (530577-TEMPUS-1-2012-1-RS-TEMPUS-JPCR). Reviewing available capacities, it has been concluded that there are no realistic ways to create a new and independent study program in the field of product development, however as a compromising solution the redesign of the module for Mechanical Structures and Mechanization master studies has been approved.

The base for achieving this goal was the redesign of the questionnaire "Product development and innovational management" realized in production companies in the region. A detailed analysis of the study programs and fields of product development has also been conducted on the following foreign institutions of higher learning: Karlsruhe Institute of Technology, Technical University of Sofia and Slovak University of Technology.

Table 1 shows the newly implemented courses on the module for Mechanical Structures and Mechanization - master academic studies, [9].

Table 1. *Newly implemented course on the module for Mechanical Structures and Mechanization - master academic studies*

No.	Course Name	Course status	Semester	ESPB
1	Reliability in the Development of Mechanical Systems	Obligatory	1	6
2	Methods of Product Development	Elective	3	6
3	Computer Application in Product Development	Elective	3	6
4	Calculation Methods in Product Development	Elective	3	6

Table 2 shows the courses with changed content in the field of product development.

Table 2. *Courses with changed content*

R.br.	Course Name	Level	Semester	ESPB
1	Industrial Design	Master	1	6
2	Mechanical transmitters 2	Master	1	6
3	Virtual Engineering	Master	3	6
4	Computer Analysis of Constructions	Master	3	6
5	Experiment in Mechanical Engineering	Master	3	6
6	Development of Cutting Tools	Doctoral	1	15
7	Development of Fixtures	Doctoral	2	15
8	Special Power Transmitters	Doctoral	3	15
9	Special Types of Gearing	Doctoral	3	15
10	Selection of Material	Doctoral	1	15

On the redesigned module for Mechanical Structures and Mechanization during 2013-14 a total of 18 students have enrolled.

#### 4. CONCLUSION

At the Faculty of Engineering of the University in Kragujevac on study programs accredited for the period from 2008 to 2012 the field of product development was represented only on certain courses within various study programs and modules.

Within the accreditation in 2013 a redesign of the module for Mechanical Structures and Mechanization on master academic studies has been conducted. The redesign was done based on the results of the questionnaire "Product development and innovational management" as well as the detailed analysis of the study programs in the field of product development on eminent universities in Europe. Four completely new courses have been added. Also, there have been changes to another five subjects on master academic studies, and five subjects on doctorate academic studies.

During the 2013-14 school year on the redesigned module Mechanical Structures and Mechanization a total of 18 students have enrolled.

Regarding the high interest of students for the field of product development, it is necessary to find the possibilities of implementing a new independent study program as soon as possible which would completely be dedicated to the study of product development.

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