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IMPROVEMENT OF PRODUCT DEVELOPMENT STUDIES IN SERBIA AND BOSNIA AND HERZEGOVINA

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IPROD

Analysis of structure and content of Industrial Product Development at colleges (high schools) of applied science in Serbia

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Product Development at colleges of applied science

21 high schools in Serbia are analyzed.

Most of them are high schools with mechanical engineering professional studies.

However, high schools in Serbia usually have not only one professional study, so they have more, for example 3 or 4.

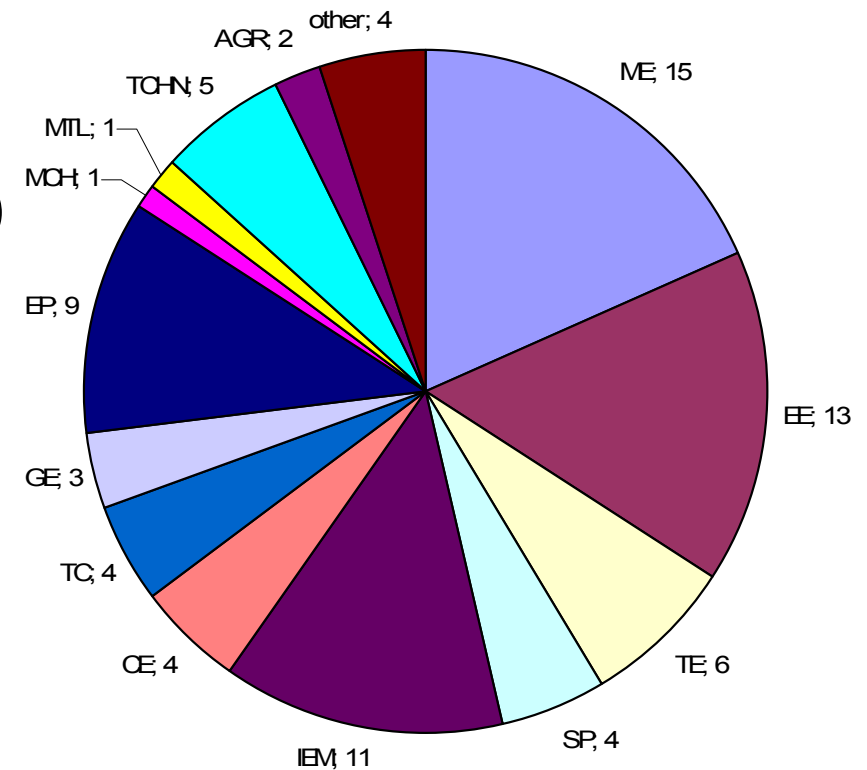
About 50% of subjects of those curriculums in one high school are the same, usually at the first three semesters.

Of course, there are high schools with only one professional study, for example high school of electrical engineering, agriculture or high school for textile.

Product Development at colleges of applied science

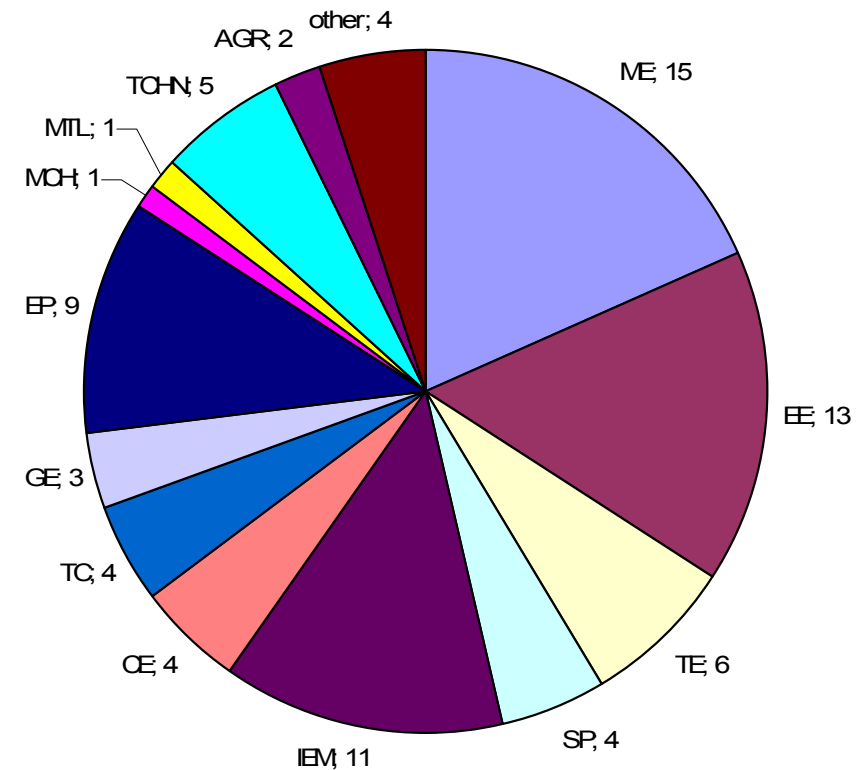
14 professional studies are noticed in this analyzing of high school curriculum content:

1. Mechanical engineering, Industrial design (15)
2. Electrical engineering, electronics, informatics and computer science (13)
3. Traffic engineering (6)
4. Safety and protection (4)
5. Industrial engineering and management (11)
6. Civil engineering (4)



Product Development at colleges of applied science

- 7. Textiles and clothing (4)
- 8. Graphic engineering and design (3)
- 9. Environmental protection (9)
- 10. Mechatronics (1)
- 11. Metallurgy (1)
- 12. Technological engineering (5)
- 13. Agriculture (2)
- 14. Economy, commercial, business, tourism, services (4)





| Higher schools | Mechanical engineering, Industrial design | Electrical engineering, electronics, informatics and computers | Traffic engineering | Safety and protection | Industrial engineering and management | Civil engineering | Textiles and clothing | Graphic engineering and design | Environmental protection | Mechatronics | Metallurgy | Technological engineering | Agriculture | Economy, commercial, business, tourism, services | Σ |
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| Σ | 15 | 13 | 6 | 4 | 11 | 4 | 4 | 3 | 9 | 1 | 1 | 5 | 2 | 4 | 82 |

Product Development at colleges of applied science

1

Tehnikum Taurunum High Engineering School of Professional Studies, Zemun (3)

- Road and Public Transport
- Fire Protection and Rescuing
- Safety and Health at the Workplace
- Mechanical Engineering - Production Engineering
- Mechanical Engineering - Process Engineering and Heat Engineering

There is no subject connected to Industrial product development.

Product Development at colleges of applied science

2

High School of Electrical Engineering and Computer Science, Belgrade (1)

- Automation and Vehicle Control Systems
- Electronics and Telecommunications
- New Energy Technologies
- Computer Science
- Audio and Video Technologies

There is no subject connected to Industrial product development.

Product Development at colleges of applied science

3

High Technical School, New Belgrade (2)

- Computerized Machine Systems - Computerized Manufacturing Systems
- Computerized Machine Systems - Computer Design and Modeling
- Industrial Engineering - Industrial Engineering with Management
- Industrial Engineering - Industrial Engineering with Computer Science

Study program: Computer-machine Systems

- MACHINE CONSTRUCTION, 4th sem.,3+2, 6 ECTS, compulsory subject
- MACHINE SYSTEMS, 5th sem.,3+2, 6 ECTS, compulsory subject

Study program: Industrial engineering

- MACHINE SYSTEMS, 5th sem.,3+2, 6 ECTS, compulsory subject



Product Development at colleges of applied science

4

Railway High School , Belgrade (5)

- Railway Traffic
- Mechanical Engineering in Railway
- Electricity in Traffic
- Construction in Railway
- Commercial Business in Railways

There is no subject connected to Industrial product development.

Product Development at colleges of applied science

5

High School of Textile - Design, Technology and Management, Belgrade (2)

- Design of Textile and Clothing
- Textile Engineering-Design and Modeling
- Management in Textile Industry

Study program: Design of textile and clothing

- Design of woven and knitted textiles 1, 3rd sem.,2+3, 6 ECTS, compulsory subject
- Design of woven and knitted textiles 2, 4th sem.,2+2, 6 ECTS, compulsory subject
- Modeling clothes 1, 4th sem.,3+2, 6 ECTS, compulsory subject
- Modeling clothes 2, 5th sem.,3+2, 5 ECTS, optional subject
- Fashion design 1, 5th sem.,2+2, 7 ECTS, compulsory subject
- Fashion design 2, 6th sem.,2+3, 5 ECTS, compulsory subject
- Design of printed textiles 1, 5th sem.,2+3, 7 ECTS, compulsory subject
- Design of printed textiles 2, 6th sem.,3+2, 5 ECTS, compulsory subject

Product Development at colleges of applied science

- Digital textile and clothing 1, 5th sem.,2+2, 6 ECTS, compulsory subject
- Digital textile and clothing 2, 6th sem.,2+2, 6 ECTS, compulsory subject
- Design of unique textiles, 5th sem.,2+2, 5 ECTS, optional subject

Study program: Textile Engineering

- Product design, 2rd sem.,2+2, 6 ECTS, compulsory subject

Study program: Textile Engineering

- Product design, 2rd sem.,2+2, 6 ECTS, compulsory subject

Study program: Management in textile industry

- Product design, 2rd sem.,2+2, 6 ECTS, compulsory subject
- Fundamentals of design and modeling clothing, 4rd sem.,3+2, 6 ECTS, optional subject

Product Development at colleges of applied science

6

Belgrade Polytechnics High School, Belgrade (6)

- Graphic Production
- Safety and Health at the Workplace
- Industrial Design
- Graphic Technology
- Conformity of Product Assessment
- Environmental Protection
- Graphic Design
- Quality Management
- Fashion Design of Leather Products
- Recycling Technologies

Study program: Graphic design

- Product development, 2+2, 6 ECTS, compulsory subject



Product Development at colleges of applied science

Study program: Design of Industrial Products

- Product development, 2+2, 5 ECTS, compulsory subject
- Products' design 1, 3+3, 9 ECTS, compulsory subject
- Products' design 2, 3+3, 9 ECTS, compulsory subject
- Products' design 3, 3+3, 8 ECTS, compulsory subject

Product Development at colleges of applied science

7

Higher Technical School of Professional Studies, Subotica (4)

- Mechanical Engineering
- Mechatronics
- Electrical Engineering
- Management
- Informatics

Study program: Mechanical engineering / Mechatronics / Management

- Integrated product development, 6th sem., 2+2, 6 ECTS, compulsory subject
- Design of mechatronic devices , 6th sem., 2+2, 6 ECTS, compulsory subject

Product Development at colleges of applied science

8

Higher Technical School of Professional Studies, Novi Sad (6)

- Mechanical Engineering
- Metallurgical
- Graphic Design Safety and Protection
- Safety and Protection
- Electrical Engineering

There is no subject connected to Industrial product development.

Product Development at colleges of applied science

9

Higher Technical School of Professional Studies, Zrenjanin (5)

- Technological Engineering - Cosmetics and Pharmaceuticals
- Technological Engineering - Environmental Protection
- Technological Engineering – Petrochemistry
- Engineering Management - Computer Science
- Engineering Management - Crisis Management
- Mechanical Engineering - Process Engineering
- Mechanical Engineering - Agricultural Engineering
- Mechanical Engineering - Automatic Control
- Design of Textile and Clothing

Study program: Mechanical engineering

Design of process equipment, 5th sem., 3+2, 7 ECTS, optional subject



Product Development at colleges of applied science

Study program: Design of Textile and clothing

- Design and modeling of women's and children's clothing, 3rd sem., 3+2, 7 ECTS, compulsory subject
- Design and modeling of menswear, 4th sem., 3+2, 7 ECTS, compulsory subject
- Design of textile and clothing, 6th sem., 2+2, 5 ECTS, optional subject

Product Development at colleges of applied science

10

High Technology School of Professional Studies, Arandjelovac (5)

- Informatics
- Environmental Protection
- Technological Engineering
- Design
- Management in Tourism

Study program: Information Technology

- Industrial design, 6rd sem., 2+2, 7 ECTS, optional subject

Study program: Design

- Product design with industrial ceramics, 6nd sem., 2+2, 5 ECTS, compulsory subject
- Product design with unique pottery, 6nd sem., 2+2, 5 ECTS, compulsory subject

Product Development at colleges of applied science

11

High School of Agriculture, Šabac (2)

- Management in Agriculture
- Horticulture and Wine Growing
- Plant Protection
- Environmental Protection
- Field and Vegetable Crops
- Stockbreeding
- Professional Veterinary

There is no subject connected to Industrial product development.



Product Development at colleges of applied science

12

High Technology School of Professional Studies, Šabac (5)

- Production Technology
- Environmental Protection
- Informatics
- Engineering Management
- Pharmaceuticals

There is no subject connected to Industrial product development.

Product Development at colleges of applied science

13

High Technology School of Professional Studies, Požarevac (5)

- Agronomy – Agriculture
- Electrical Engineering
- Mechanical Engineering - Production Engineering
- Mechanical Engineering – CAD Design
- Mechanical Engineering - Risk Management
- Ecology - Environmental Protection
- Food Processing Technology

Study program: Mechanical engineering

- Computer aided design, 5th sem., 3+3, 7 ECTS, obligatory subject



Product Development at colleges of applied science

14

High Technology School of Professional Studies, Čačak (4)

- Electrical Power Engineering
- Industrial Informatics
- Production Engineering
- Graphic Techniques
- Production Management

Study program: Industrial informatics / Manufacturing engineering

- Computer modeling and analysis of structures, 5th sem., 1+3, 8 ECTS, optional subject

Product Development at colleges of applied science

15

High Technology School of Professional Studies, Kragujevac (4)

- Informatics
- Road Traffic
- Engines and Vehicles
- Urban Engineering

There is no subject connected to Industrial product development.



Product Development at colleges of applied science

16

High Technical and Mechanical School of Professional Studies, Trstenik (3)

- Informatics in Engineering
- Traffic Engineering
- Hydraulics and Pneumatics
- Production Engineering
- Agricultural Food Processing Equipment

Study program: Informatics in engineering / Hydraulics and pneumatics

- Integrated product development, 5th sem., 2+2, 6 ECTS, obligatory subject

Study program: Manufacturing Eng.

- Designing technology measuring systems, 5th sem., 2+3, 7 ECTS, obligatory subject
- Machine construction 5th sem., 2+4, 8 ECTS, obligatory subject

Product Development at colleges of applied science

17

High Business and Technical School of Professional Studies, Užice (6)

- Informatics
- Management
- Mechanical Engineering
- Civil Engineering
- Engineering of Environmental Protection
- Tourism

Study program: Mechanical engineering

- Computer aided design, 5th sem., 2+2, 5 ECTS, obligatory subject

Study program: Mechanical engineering

- Innovation management, 4th sem., 2+2, 5 ECTS, obligatory subject
- Management of strategy and development, 4th sem., 3+2, 6 ECTS, obligatory subject



Product Development at colleges of applied science

18

High Technology School of Professional Studies, Niš (5)

- Industrial Engineering
- Road Traffic
- Communication Technology
- Modern Computer Technology
- Civil Engineering
- Environmental Protection and Regional Planning

Study program: Industrial engineering / Environmental protection

- Sustainable development, 3rd sem., 3+2, 7 ECTS, obligatory subject



Product Development at colleges of applied science

19

High Textile School of Professional Studies, Leskovac (1)

- Textile Technology
- Textile Chemistry and Environmental Protection
- Confection
- Fashion Design

Study program: Clothing and Fashion Design

- creating clothing 1, 3rd sem., 2+3, 7 ECTS, obligatory subject
- creating clothing 2, 4rd sem., 2+3, 7 ECTS, obligatory subject
- designing of clothing, 5rd sem., 4+2, 5 ECTS, obligatory subject
- modeling clothing, 6rd sem., 2+2, 7 ECTS, obligatory subject

Product Development at colleges of applied science

20

High School of Applied Professional Studies, Vranje (5)

- Environmental Protection
- Food Processing Technology
- Wood Technology
- Traffic Engineering
- Mechanical Engineering
- Production Economics

Study program: Environmental protection

- Sustainable development, 5rd sem., 3+3, 6 ECTS, obligatory subject

Product Development at colleges of applied science

21

Higher Technical School of Professional Studies, Zvečan (3)

- Production Management
- Engineering Informatics
- Management in Electrical Engineering
- Energetics
- Fire Protection

There is no subject connected to Industrial product development.

Product Development at colleges of applied science

Subjects connected with Industrial product development are from the following fields:

- Mechanical engineering, Industrial design (60%)
- Electrical engineering, electronics, informatics and computer science (23.1%)
- Industrial engineering and management (27.3%)
- Textiles and clothing (75%)
- Graphic engineering and design (66.7%)
- Environmental protection (22.2%)
- Mechatronics (100%)

• But, if we look for all high schools **Industrial product development covers only 26.8%** of all study programs in high schools in Serbia.



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Thank You for Your attention

