

# LOGISTIKA MATERIALA IN SREDSTEV

## UČNI NAČRT PREDMETA/COURSE SYLLABUS

<b>Predmet:</b>	Logistika materiala in sredstev
<b>Course title:</b>	Logistics of material and resources
<b>Članica nosilka/UL Member:</b>	UL FS

<b>Študijski programi in stopnja</b>	<b>Študijska smer</b>	<b>Letnik</b>	<b>Semestri</b>	<b>Izbirnost</b>
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Industrijsko inženirstvo (smer)	3. letnik	1. semester	obvezni

**Univerzitetna koda predmeta/University course code:** 0563553

**Koda učne enote na članici/UL Member course code:** 3068-V

<b>Predavanja /Lectures</b>	<b>Seminar /Seminar</b>	<b>Vaje /Tutorials</b>	<b>Klinične vaje /Clinical tutorials</b>	<b>Druge oblike študija /Other forms of study</b>	<b>Samostojno delo /Individual student work</b>	<b>ECTS</b>
30		30			40	4

**Nosilec predmeta/Lecturer:** Marko Šimic, Mihael Debevec, Niko Herakovič

**Izvajalci predavanj:**

**Izvajalci seminarjev:**

**Izvajalci vaj:**

**Izvajalci kliničnih vaj:**

**Izvajalci drugih oblik:**

**Izvajalci praktičnega usposabljanja:**

**Vrsta predmeta/Course type:**

Izbirni strokovni predmet /Elective specialised course

**Jeziki/Languages:**

Predavanja/Lectures:

Slovenščina

Vaje/Tutorial:

Slovenščina

**Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:****Prerequisites:**

Izpolnjevanje pogojev za vpis v Visokošolski strokovni študijski program I. stopnje Strojništvo - Projektno aplikativni program.

Meeting the enrollment conditions for the MECHANICAL ENGINEERING - Project Oriented Applied Programme.

**Vsebina:****Content (Syllabus outline):**

1. Logistične aktivnosti
  - Opredelitev logistike materiala in sredstev v proizvodnji, trije vidiki in vloga logistike pri povečanju konkurenčnosti proizvodnje
  - Proizvodno podjetje po standard ISO in logistične povezave znotraj podjetja
  - Proizvodna logistika, delitev z vidika organiziranja
  - Logistika delovnega mesta, logistični proces strege materiala po VDI 3300
  - Optimalna gospodarnost proizvodnega procesa, logistična zmogljivost in sposobnost oskrbe
2. Vhodna in skladiščna logistika
  - Mesto nastanka zalog in vrste skladišč, zaloge v proizvodnih podjetjih in razlog za njihov nastanek
  - Diagram naročanja materiala, razmerje med obsegom proizvodnje, pretočnimi časi in zalogami
  - Kategorizacija skladišč, vplivne veličine pri načrtovanju skladišč, načini skladiščenja in tipi skladišč, določanje kapacitete skladišča
  - Ročna in avtomatizirana visoko regalna skladišča in sistemi, kriteriji načrtovanja in izbire
  - Sledljivost izdelkov v skladiščih
3. Logistika notranjega transporta v proizvodnem podjetju
  - Opredelitev notranjega transporta, vpliv na izvajanje proizvodnega procesa,

1. Logistic activities
  - Defining logistics of materials and assets in production, three aspects and the role of logistics in the increase of production competitiveness
  - Production company according to ISO standard and logistical connections within the company
  - Production logistics, division in terms of organization
  - Logistics of workplace, logistic process of material handling according to VDI 3300
  - Optimal cost-effectiveness of the production process, logistical capacity and supply capability
2. Inbound and warehouse logistics
  - Place of occurrence of stock and type of warehouses, stocks in manufacturing companies and the reason for their occurrence
  - Material ordering diagram, ratio among production volume, lead times and inventories
  - Categorization of warehouses, influential parameters in the design of warehouses, methods of storage and types of warehouses, determining the capacity of the warehouse
  - Manual and automated high-rack warehouses and systems, design and selection criteria
  - Traceability of products in

<p>transportirane dobrine, načrtovanje transporta in transportni proces</p> <ul style="list-style-type: none"> <li>- Transportna sredstva in njihove značilnosti</li> <li>- Viličarji in avtonomno vodena vozila, tipi, krmiljenje, primernost uporabe v proizvodnih procesih, določitev časov in kapacitete transportnega sistema, prometni količnik</li> <li>- Tipi, lastnosti in načini uporabe transporterjev, kapaciteta transporterjev, hitrostno pravilo</li> <li>- Transportne poti, načrtovanje transporta, postavitev skladišč</li> <li>- Tok materiala v proizvodnem podjetju in metode za analizo gostote toka materiala, skupno transportno delo</li> <li>- Sredstva za hranjenje materiala med transportom in skladiščenjem</li> </ul> <p>4. Modeliranje notranjih logističnih procesov</p> <ul style="list-style-type: none"> <li>- Modeliranje logističnih procesov</li> <li>- Logistični process kot dogodek, definiranje vhodov in izhodov</li> <li>- Povezava posameznih dogodkov v verigo</li> </ul> <p>5. Simulacija in optimizacija notranjih logističnih procesov</p> <ul style="list-style-type: none"> <li>- Simulacija logističnih procesov</li> <li>- Optimizacija s simulacijo diskretnih dogodkov</li> <li>- Primeri uporabe simulacije v realnih proizvodnih logističnih procesih, optimizacija skladiščenja in transporta</li> </ul> <p>6. Logistika obdelovalnih pripomočkov (OP)</p> <ul style="list-style-type: none"> <li>- Opredelitev, pozicioniranje in vpenjanje obdelovancev</li> <li>- Razvrstitev OP po postopkih obdelave in po rabi, stopnja avtomatizacije in načini gradnje, število vpetij</li> <li>- Osnovne in položajne ravnine, pozicioniranje glede na tip obdelave in centriranje</li> <li>- Pozicionirni elementi in podpore, napake pri pozicioniranju</li> </ul> <p>7. Logistika vpenjanja</p> <ul style="list-style-type: none"> <li>- Opredelitev vpenjanja,</li> <li>- Vpenjalne sile - velikost in usmerjenost</li> <li>- Izračun vpenjalnih sil</li> </ul>	<p>warehouses</p> <p>3. Logistics of internal transport in the manufacturing company</p> <ul style="list-style-type: none"> <li>- Definition of internal transport, impact on production process implementation, transported goods, transport planning and transport process</li> <li>- Means of transport and their characteristics</li> <li>- Forklifts and autonomously guided vehicles, types, control, suitability for use in production processes, timing and capacity of the transport system, traffic quotient</li> <li>- Types, properties and modes of use of conveyors, capacity of conveyors, speed rule</li> <li>- Transport routes, transport planning, warehouse layout</li> <li>- Material flow in a manufacturing company and methods for density analysis of material flow, joint transport work</li> <li>- Means of storing material during transport and storage</li> </ul> <p>4. Modelling of internal logistic processes</p> <ul style="list-style-type: none"> <li>- Modelling of logistics processes</li> <li>- Logistic process as an event, definition of inputs and outputs</li> <li>- Connecting individual events into a chain</li> </ul> <p>5. Simulation and optimization of internal logistic processes</p> <ul style="list-style-type: none"> <li>- Simulation of logistic processes</li> <li>- Optimization with simulation of discrete events</li> <li>- Examples of using simulation in real production logistic processes, optimization of storage and transport</li> </ul> <p>6. Logistics of machining accessories (MA)</p> <ul style="list-style-type: none"> <li>- Definition, positioning and clamping of workpieces</li> <li>- Classification of MA according to machining type and the type of use, degree of automation and methods of construction, number of clampings</li> <li>- Basic and positional planes, positioning by machining type and</li> </ul>
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<ul style="list-style-type: none"> <li>- Izvor vpenjalnih sil in vpenjalni elementi</li> <li>- Oblike tlačnih elementov, ekscentri in izsredniki</li> </ul> <p>8. Mehanizirano vpenjanje</p> <ul style="list-style-type: none"> <li>- Pnevmatično vpenjanje, nadtlak, podtlak, krmilne sheme</li> <li>- Hidravlično vpenjanje, nizko in visokotlačni vpenjalni sistemi, krmilne sheme</li> </ul> <p>9. Prenos vpenjalnih sil</p> <ul style="list-style-type: none"> <li>- Opredelitev prenosa vpenjalnih sil</li> <li>- Načini prenosa vpenjalne sile in izračun sil</li> <li>- Vpenjalni trni, konstrukcijske značilnosti različnih vpenjalnih trnov</li> <li>- Vpenjalne stročnice in sile vpenjanja</li> </ul> <p>10. Obdelovalni pripomočki za različne obdelave</p> <ul style="list-style-type: none"> <li>- Razvrstitev obdelovalnih pripomočkov glede na vrsto obdelave</li> <li>- Načini vpenjanja pri različnih tipih obdelave</li> <li>- Izbor vpenjalnih pripomočkov</li> <li>- Vpenjanje s sojemali</li> <li>- Primeži</li> <li>- Okrovi vpenjalnih pripomočkov</li> </ul> <p>11. Gospodarjenje z obdelovalnimi pripomočki (OP)</p> <ul style="list-style-type: none"> <li>- Učinkovita raba OP, skrajšanje časa vpenjanja in obdelave</li> <li>- Izračun vrednosti izdelanega, sestavljenega in kupljenega OP</li> <li>- Stroški pri obdelavi</li> <li>- Določitev mejnega števila obdelovancev glede stroškov za različne obdelave</li> </ul> <p>12. Logistika materiala v avtomatiziranih obdelovalnih sistemih</p> <ul style="list-style-type: none"> <li>- Priprava obdelovancev, dodajanje in odvzemanje, pozicioniranje in vpenjanje, prenos med izdelovalnimi mesti</li> <li>- Tipi avtomatiziranih izdelovalnih sistemov in optimiranje izdelovalnih časov in stroškov</li> <li>- Ročna in avtomatizirana logistika materiala pri struženju glede na vrsto in organiziranost obdelave</li> <li>- Robotizirana strega stružnice (linearni in ploskovni portalni robot, prostostoječi robot, prigradeni robot,</li> </ul>	<p>centering</p> <ul style="list-style-type: none"> <li>- Position elements and supports, positioning errors</li> </ul> <p>7. Logistics of clamping</p> <ul style="list-style-type: none"> <li>- Definition of clamping,</li> <li>- Clamping forces - size and orientation</li> <li>- Calculation of clamping forces</li> <li>- Source of clamping forces and clamping elements</li> <li>- Pressure element shapes and eccentres</li> </ul> <p>8. Mechanized clamping</p> <ul style="list-style-type: none"> <li>- Pneumatic clamping, overpressure, underpressure, control schematics</li> <li>- Hydraulic clamping, low and high pressure clamping systems, control schematics</li> </ul> <p>9. Transfer of clamping forces</p> <ul style="list-style-type: none"> <li>- Defining the transfer of clamping forces</li> <li>- Methods of transfer of clamping forces and calculation of forces</li> <li>- Clamping spikes, design characteristics of different clamping cspikes</li> <li>- Clamping locking sleeves and clamping forces</li> </ul> <p>10. Machinery accessories for different machining</p> <ul style="list-style-type: none"> <li>- Categorization of machining accessories by type of processing</li> <li>- Clamping types for different types of machining</li> <li>- Choice of clamping accessories</li> <li>- Clamping with anti-turning devices</li> <li>- Machine vices</li> <li>- Clamping device housings</li> </ul> <p>11. Management with machining accessories (MA)</p> <ul style="list-style-type: none"> <li>- Effective use of MA, shortening of clamping time and machining time</li> <li>- Calculating the value of manufactured, assembled and purchased MA</li> <li>- Processing costs</li> <li>- Determining the limit of the number of workpieces in terms of costs for different treatments</li> </ul> <p>12. Material logistics in automated machining systems</p>
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<p>mobilni robot), vrste prijemal</p> <ul style="list-style-type: none"> <li>- Logistika strege več strojev in izdelovalnih celic</li> </ul> <p>13. Logistika strege v vrtalno-frezalnih sistemih</p> <ul style="list-style-type: none"> <li>- Vrste vrtalno frezalnih strojev in stopnjevanje avtomatizacije posameznih strežnih funkcij</li> <li>- Strežne enote - pripomočki, palete, menjalniki palet, zalogovniki, roboti, prijemala</li> <li>- Časi menjave obdelovancev</li> <li>- Menjava obdelovancev s paletami in paletnimi postajami</li> <li>- Strega z roboti</li> </ul> <p>14. Logistika strege v varilnih celicah in v avtomatiziranih preoblikovalnih sistemih (APS)</p> <ul style="list-style-type: none"> <li>- Robotizirane varilne celice</li> <li>- Pozicionirne in vpenjalne mize</li> <li>- Vplivni parametri pri stregi v APS</li> <li>- Kriteriji izbire optimalnega strežnega sistema</li> <li>- Strega trakov, palic in profilov</li> <li>- Strega v transfer preoblikovalnih sistemih</li> </ul> <p>15. Logistika orodij</p> <ul style="list-style-type: none"> <li>- Logistika orodij v posamični in serijski proizvodnji</li> <li>- Logistika informacij in materialnega toka orodij</li> <li>- Racionalno gospodarjenje z orodji</li> <li>- Logistika menjave orodij na strojih</li> <li>- Identifikacija in sledljivost orodi</li> </ul>	<ul style="list-style-type: none"> <li>- Preparation of workpieces, adding and removal, positioning and clamping, transfer between manufacturing locations</li> <li>- Types of automated production systems and optimization of production times and costs</li> <li>- Manual and automated material logistics for turning, based on the type and organization of processing</li> <li>- Robotized handling of lathes (linear and flat portal robot, freestanding robot, mounted robot, mobile robot), types of grippers</li> <li>- Handling logistics for multiple machines and production cells</li> </ul> <p>13. Handling logistics for drilling and milling systems</p> <ul style="list-style-type: none"> <li>- Types of drilling and milling machines and increase of automation of individual handling functions</li> <li>- Handling units - accessories, pallets, pallet changers, storages, robots, grippers</li> <li>- Workpiece change times</li> <li>- Replacement of workpieces with pallets and pallet stations</li> <li>- Handling with robots</li> </ul> <p>14. Handling Logistics in welding cells and automated forming systems (AFS)</p> <ul style="list-style-type: none"> <li>- Robotic welding cells</li> <li>- Positioning and clamping tables and jigs</li> <li>- Influence parameters for handling in AFS</li> <li>- Criteria for selecting the optimal handling system</li> <li>- Handling of strips, rods and profiles</li> <li>- Handling of transfer forming systems</li> </ul> <p>15. Logistics of tools</p> <ul style="list-style-type: none"> <li>- Logistics of tools in individual and batch production</li> <li>- Logistics of information and material flow of tools</li> <li>- Rational economics of tools</li> <li>- Logistics of changing tools on machines</li> <li>- Identification and traceability of tools</li> </ul>
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## Temeljna literatura in viri/Readings:

1. Tao, F., Zhang, M., Nee, A.Y.C.: Digital Twin Driven Smart Manufacturing, Elsevier, 2019
2. Kuzman, K. et. al.: Moderno proizvodno inženirstvo, Grafis Trade, Grosuplje, 2010
3. Herakovič, N., Noe, D.: Strega materiala in sredstev, Učno gradivo, UL FS, 2008
4. Groover, M.,R: Automation Production Systems and Computer Integrated Manufacturing, (3rd Edition) Prentice-Hall Int. Ed. 2008
5. Ghiani, G., Laporte, G., Musmanno, R.: Introduction to Logistics Systems Planning and Control, John Wiley & Sons, USA, 2004

## Cilji in kompetence:

### Cilji:

1. Usvojiti osnovna znanja in tehnologije logistike materiala in sredstev kot orodja za povečanje učinkovitosti izdelovalnih procesov
2. Spoznati in razumeti različne logistične procese strege materiala in sredstev in se jih naučili pravilno načrtovati
3. Spoznati izdelovalna sredstva in vire ter obdelovalne pripomočke in jih znati načrtovati ter učinkovito uporabiti
4. Spoznati logistične značilnosti različnih izdelovalnih procesov

### Kompetence:

1. Uporaba tehnologij proizvodne logistike za povečanje učinkovitosti izdelovalnih procesov
2. Načrtovanje učinkovitih logističnih procesov in sistemov za povečanje izkoriščenosti izdelovalnih sredstev
3. Načrtovanje in učinkovita uporaba izdelovalnih sredstev ter pripomočkov
4. Določitev najbolj primerne in učinkovitega logističnega sistema za izbran izdelovalni proces

## Objectives and competences:

### Objectives:

1. To acquire basic knowledge and technologies of material and mean's logistics as a tool to increase the efficiency of manufacturing processes
2. To know and understand the various logistic processes of handling of materials and means and to learn how to design them properly
3. To know the production means and resources and the manufacturing accessories and to know how to plan and use them effectively
4. To gain knowledge of the logistic characteristics of different manufacturing processes

### Competencies:

1. Use of manufacturing logistics technologies to increase the efficiency of manufacturing processes
2. Planning efficient logistic processes and systems to increase the utilization of manufacturing assets
3. Planning and efficient use of manufacturing means and accessories
4. Determining the most appropriate and efficient logistics system for the selected manufacturing process

## Predvideni študijski rezultati:

### Znanja:

Poznavanje in razumevanje logističnih aktivnosti v proizvodnji in njihov pomen ter vpliv na stroške, učinkovitost

## Intended learning outcomes:

### Knowledge:

Knowledge and understanding of logistics activities in manufacturing and their importance, and impact on costs,

<p>proizvodnje ter kapaciteto izdelovalnih sistemov in pretočne čase. Poznavanje in razumevanje vloge in vpliva logističnih procesov skladiščenja in transporta na učinkovitost izdelovalnih procesov in sistemov. Poznavanje in razumevanje logistike strege različnih izdelovalnih sistemih, še posebno avtomatiziranih. Poznavanje in razumevanje pomena pozicioniranja in vpenjanja v izdelovalnih sistemih ter logistike in gospodarjenja z izdelovalnimi pripomočki in orodji.</p> <p><b>Spretnosti:</b></p> <ol style="list-style-type: none"> <li>1. Načrtovanje logističnih sistemov strege materiala in sredstev</li> <li>2. Uporaba računalniško podprtih orodij za analizo in optimizacijo ter načrtovanje logističnih procesov in sistemov</li> <li>3. Načrtovanje in oblikovanje vpenjalnih naprav in obdelovalnih pripomočkov</li> <li>4. Gospodarjenje z orodji, obdelovalnimi pripomočki strežnimi napravami</li> </ol>	<p>production efficiency and capacity of manufacturing systems and material flow times. Knowledge and understanding of the role and impact of logistics of storage and transport processes on the efficiency of manufacturing processes and systems. Knowledge and understanding of the logistics of the handling of different manufacturing systems, especially automated ones. Knowledge and understanding of the importance of positioning and clamping in manufacturing systems, as well as logistics and management of production accessories and tools.</p> <p><b>Skills:</b></p> <ol style="list-style-type: none"> <li>1. Design of logistic systems for handling of materials and resources</li> <li>2. Using computer-aided tools for analysing, optimizing planning of logistic processes and systems</li> <li>3. Planning and design of clamping devices and manufacturing accessories</li> <li>4. Economic management of tools, machining accessories and handling devices</li> </ol>
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<b>Metode poučevanja in učenja:</b>	<b>Learning and teaching methods:</b>
<ol style="list-style-type: none"> <li>1. P1, P2 Avditorna predavanja podprta z interaktivnim prikazom praktičnih primerov</li> <li>2. P3 Avditorne vaje z reševanjem praktičnih primerov</li> <li>3. P4 Laboratorijske vaje s timskim reševanjem aplikativnih problemov in uporabo programske opreme ter njihova predstavitev z razpravo.</li> <li>4. P5 Uporaba študijskega gradiva v e-obliki, skripta in e-verzija predavanj.</li> <li>5. P6 Interaktivna predavanja</li> </ol>	<ol style="list-style-type: none"> <li>1. P1, P2 Lectures supported by interactive presentation of practical examples</li> <li>2. P3 Tutorials solving practical examples</li> <li>3. P4 Laboratory exercises with team solving of application problems, using software and presenting them with discussion.</li> <li>4. P5 Use of study material in e-form, lecture notes and e-version of lectures.</li> <li>5. P6 Interactive lectures</li> </ol>

<b>Načini ocenjevanja:</b>	<b>Delež/ Weight</b>	<b>Assessment:</b>
- Teoretične vsebine (predavanja): Kolokviji, pisni in/ali ustni izpit	50,00 %	-Theoretical contents (lectures): Cllloquium, writing and/or oral

		exam
- Samostojno delo na avditornih in laboratorijskih vajah (vključno s poročili):	50,00 %	- Individual work in exercises, individual laboratory work (including reports):

### Reference nosilca/Lecturer's references:

#### Niko Herakovič:

1. DEBEVEC, Mihael, HERAKOVIČ, Niko. Management of resources in small and medium-sized production enterprises. *Iranian journal of science and technology. Transaction B, Technology*, ISSN 1028-6284, 2010, vol. 34, no. B5, str. 509-520. [COBISS.SI-ID [11670555](#)], [JCR, SNIP, WoS, Scopus]
2. PIPAN, Miha, HERAKOVIČ, Niko. Volume flow characterization of PWM-controlled fast-switching pneumatic valves. *Strojniški vestnik*, ISSN 0039-2480, Sep. 2016, vol. 62, no. 9, str. 543-550, SI 89, ilustr., doi: [10.5545/sv-jme.2016.3531](#). [COBISS.SI-ID [14802715](#)], [JCR, SNIP, WoS, Scopus]
3. ŠIMIC, Marko, DEBEVEC, Mihael, HERAKOVIČ, Niko. Modelling of hydraulic spool-valves with specially designed metering edges. *Strojniški vestnik*, ISSN 0039-2480, Feb. 2014, vol. 60, no. 2, str. 77-83, SI 20, ilustr., doi: [10.5545/sv-jme.2011104](#). [COBISS.SI-ID [13344795](#)], [JCR, SNIP, WoS, Scopus]
4. HERAKOVIČ, Niko. Robot vision in industrial assembly and quality control processes. V: UDE, Aleš (ur.). *Robot vision*. Vukovar: In-Tech. 2010, str. 501-534, ilustr. [COBISS.SI-ID [11381787](#)]
5. HERAKOVIČ, Niko, ZUPAN, Hugo, DEBEVEC, Mihael. *Simulacijski model za spremljanje transakcij zalog v skladišču : zaključno poročilo o rezultatih raziskovalno razvojnega dela*. Ljubljana: Fakulteta za strojništvo, Laboratorij LASIM, 2016. 13 f., ilustr. [COBISS.SI-ID [16022555](#)]

#### Marko Šimic:

1. ŠIMIC, Marko, DEBEVEC, Mihael, HERAKOVIČ, Niko. Modelling of hydraulic spool-valves with specially designed metering edges. *Strojniški vestnik*. Feb. 2014, vol. 60, no. 2, str. 77-83, si 20, ilustr. ISSN 0039-2480. DOI: [10.5545/sv-jme.2013.1104](#). [COBISS.SI-ID [13344795](#)], [JCR, SNIP, WoS, Scopus]
2. ŠIMIC, Marko, HERAKOVIČ, Niko. Experimental analysis of tribological behaviour of advanced composite spools used in commercial pneumatic spool valves. *Tribology international*. May 2016, vol. 97, str. 151-162, ilustr. ISSN 0301-679X. DOI: [10.1016/j.triboint.2016.01.012](#). [COBISS.SI-ID [14459675](#)], [JCR, SNIP, WoS, Scopus]
3. HERAKOVIČ, Niko, ŠIMIC, Marko. Novel digital piezo valve used for high-response hydraulic linear drive position control. *Innovations in Discrete Productions*. 2016, year 4, iss. 2, str. 42-45, ilustr. ISSN 1314-8907. [COBISS.SI-ID [16521243](#)]
4. ŠIMIC, Marko, KOS, Andrej, DEBEVEC, Mihael, ADROVIČ, Edo, PIPAN, Miha, ZUPAN, Hugo, RESMAN, Matevž, TURK, Maja, PROTNER, Jernej, HERAKOVIČ, Niko. *Koncipiranje demonstracijskega centra Pametne tovarne LASIM (Industrija 0) : zaključno poročilo o rezultatih raziskovalno razvojnega dela*. Ljubljana: Fakulteta za strojništvo, Laboratorij za strego, montažo in pnevmatiko, 2018. 84 f., ilustr. [COBISS.SI-ID [16226843](#)]
5. DEBEVEC, Mihael, ZUPAN, Hugo, PIPAN, Miha, ŠIMIC, Marko, KOS, Andrej, ADROVIČ, Edo, TURK, Maja, RESMAN, Matevž, HERAKOVIČ, Niko. Študija



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**Mihael Debevec:**

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