

VODENJE PROIZVODNJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Vodenje proizvodnje
Course title:	PRODUCTION LEADING
Članica nosilka/UL Member:	UL FS

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

Univerzitetna koda predmeta/University course code:	0563551
Koda učne enote na članici/UL Member course code:	3066-V

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

Nosilec predmeta/Lecturer:	Tomaž Berlec
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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. Predavanje: Uvod v vodenje proizvodnje
 - Naloge operativnega vodenja proizvodnje;
 - Delitev proizvodnje glede na količine predmetov dela;
 - Delitev dela glede na tok materiala.
2. Predavanje: Timsko delo
 - Razlika med timskim in skupinskim delom;
 - Načini gradnje učinkovitega tima;
 - Posebnosti virtualnih timov v distribuiranih okoljih.
3. Predavanje: Izračunavanje in napovedovanje potreb
 - Deterministični izračun potreb po delovnih sredstvih;
 - Deterministični izračun potreb po delavcih;
 - Napovedovanje potreb.
4. Predavanje: Ugotavljanje dejanske razpoložljivosti:
 - delovnih sredstev,
 - delavcev,
 - materiala in informacij.
5. Predavanje: Večmestna strežba delavca strojem
 - Vgrajeni tip;
 - Popolnoma prekrivni tip;
 - Delno prekrivni tip.
6. Predavanje: Minimizacija stroškov nabavnih in proizvodnih naročil (serij).
 - Modeli zalog;

1. Lecture: Introduction to production management
 - Tasks of operational production management;
 - Types of production regarding the quantity of work objects;
 - Types of work regarding the material flow.
2. Lecture: Teamwork
 - The difference between teamwork and group work;
 - Ways to build an effective team;
 - Specificity of virtual teams in distributed environments.
3. Lecture: Calculating and forecasting requirements
 - Deterministic calculation of work tools requirements;
 - Deterministic calculation of workers' requirements;
 - Requirements forecasting.
4. Lecture: Determination of actual availability of:
 - work tools,
 - workers,
 - material and information.
5. Lecture: Multi location handling (worker-machine)
 - Built-in type;
 - Fully overlapping type;
 - Partially overlapping type.
6. Lecture: Minimizing the costs of purchase and production orders

<ul style="list-style-type: none"> - Minimalni stroški materiala na izstopu iz skladišča; - Izračun optimalnih količin serij. <p>7. Predavanje: Oblikovanje informacij za vodenje proizvodnje</p> <ul style="list-style-type: none"> - Delovna naročila (zunanja, notranja); - Delovni nalog; - Informacije za vodenje proizvodnje. <p>8. Predavanje: Vodenje serijske proizvodnje</p> <ul style="list-style-type: none"> - Izdelava potrebnih dokumentov za vodenje proizvodnje; - Preverjanje razpoložljivosti potreb; - Sprožanje naročil in zajem povratnih informacij. <p>9. Predavanje: Vodenje individualne proizvodnje</p> <ul style="list-style-type: none"> - Posebnosti vodenja individualne proizvodnje; - Vodenje projekta v individualni proizvodnji; - Povezava vodenja proizvodnje z vodenjem projekta naročila. <p>10. Predavanje: Načini izvedbe proizvodnje</p> <ul style="list-style-type: none"> - Potisni način; - Vlečni način; - Kombinirani način. <p>11. Predavanje: Načrtovanje materialnih potreb (MRP) in načrtovanje proizvodnih virov (MRP II) v poslovnem informacijskem sistemu (ERP sistemu)</p> <ul style="list-style-type: none"> - Značilnosti in potek izvedbe MRP; - Značilnosti in potek izvedbe MRP II; - Sklenjena zanka vodenja proizvodnje. <p>12. Predavanje: KANBAN način izvedbe vlečne proizvodnje</p> <ul style="list-style-type: none"> - Vrste KANBAN sistemov; - Izračun potrebnega števila kanbanov; - Tok kanbanov v proizvodnji. <p>13. Predavanje: Operativno spremljanje proizvodnje</p> <ul style="list-style-type: none"> - Spremljanje časov izvedbe operacij; - Primerjava dejanskih časov in stroškov s planiranimi; - Sprejemanje ukrepov. <p>14. Predavanje: Informacijski sistemi za vodenje proizvodnje (MES)</p> <ul style="list-style-type: none"> - Povezava MES sistemov z ERP sistemom; - Kontrola podatkov pridobljenih z 	<p>(batches).</p> <ul style="list-style-type: none"> - Inventory models; - Minimum cost of material on exiting the warehouse; - Calculation of optimal batch quantities. <p>7. Lecture: Designing information for production management</p> <ul style="list-style-type: none"> - Work orders (external, internal); - Work warrant; - Information for production management. <p>8. Lecture: Management of batch production</p> <ul style="list-style-type: none"> - Preparation of necessary documentation for production management; - Checking the availability of requirements; - Trigger orders and capture of feedback information. <p>9. Lecture: Managing individual production</p> <ul style="list-style-type: none"> - Specifics of managing individual production; - Project management in individual production; - Link between production management and project management of order. <p>10. Lecture: Strategies of production</p> <ul style="list-style-type: none"> - Push; - Pull; - Push-Pull. <p>11. Lecture: Material requirements planning (MRP) and production resource planning (MRP II) in business information system (ERP system)</p> <ul style="list-style-type: none"> - Characteristics and course of MRP implementation; - Characteristics and course of MRP II implementation; - Closed production management loop. <p>12. Lecture: KANBAN method of Pull production</p> <ul style="list-style-type: none"> - Types of KANBAN systems; - Calculation of the required number of kanbans; - Flow of kanbans in production. <p>13. Lecture: Operational monitoring of production</p>
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<p>MES glede na pravilnost in popolnost;</p> <ul style="list-style-type: none"> - Korekcije časov in stroškov. <p>15. Predavanje: Odpravljanje zapravljanj v proizvodnji</p> <ul style="list-style-type: none"> - Vrste zapravljanj; - Metode za odpravljanje zapravljanj; - Izračun količnika dodane vrednosti. 	<ul style="list-style-type: none"> - Monitoring the operation times; - Comparison of actual times and costs with planned ones; - Taking measures. <p>14. Lecture: Management Information Systems (MES)</p> <ul style="list-style-type: none"> - Links between MES and ERP systems; - Control of data obtained from MES in regard to correctness and completeness; - Time and cost adjustments. <p>15. Lecture: Eliminating production wastes</p> <ul style="list-style-type: none"> - Types of wastes; - Methods for eliminating waste; - Calculation of the added value ratio.
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Temeljna literatura in viri/Readings:

Jay H. Heizer, Barry Render, Howard J. Weiss: Principles of Operations Management, Pearson Prentice Hall, 2008

Womack J.P., Jones D.T., Lean Thinking, Campus Verlag, 2013

[Productivity Press. Development Team](#): Kanban for the shopfloor: a leader's guide, Productivity Press, cop. 2003

Lyssa Adkins: Coaching Agile Teams: A Companion for ScrumMasters, Agile Coaches, and Project Managers in Transition, Addison Wesley Signature Series, 2010

Cilji in kompetence:

Cilji:

Spoznati moderne koncepte vodenja proizvodnje

Spoznati namen in načine vodenja proizvodnje

Spoznati problematiko in cilje vodenja proizvodnje

Kompetence:

S1-PAP Sposobnost uporabe pridobljenih znanj pri reševanju problemov vodenja proizvodnje v praksi.

S4-PAP Sposobnost razčlenitve lažjih strokovnih nalog pri vodenju proizvodnje na podnaloge

S7-PAP Usposobljenost za vodenje tehnološke enote vodenja proizvodnje

Objectives and competences:

Objectives:

To learn modern concepts of production management

To know the purpose and ways of managing production

To learn the issues and goals of production management

Competencies:

S1-PAP The ability to use the attained knowledge in solving production management problems in practice.

S4-PAP The ability to break down professional tasks in managing production of lesser complexity into subtasks

S7-PAP The ability to manage a

P7-PAP Pozna nekatera potrebna programska orodja za vodenje proizvodnje	production management unit P7-PAP Knowing some of the software tools necessary for production management
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Predvideni študijski rezultati:

<p>Znanja:</p> <p>Z1: Poglobljeno strokovno teoretično in praktično znanje na področju vodenja proizvodnje, podprto s širšo teoretično in metodološko osnovo.</p> <p>Spretnosti:</p> <p>S1.1 Izvajanje kompleksnih operativno-strokovnih opravil na področju vodenja proizvodnje, ki vključujejo tudi uporabo metodoloških orodij</p> <p>S1.2 Obvladovanje zahtevnih, kompleksnih delovnih procesov pri vodenju proizvodnje ob samostojni uporabi znanja v novih situacijah.</p> <p>S1.3 Diagnosticiranje in reševanje problemov vodenja proizvodnje v različnih specifičnih delovnih okoljih, povezanih s področjem izobraževanja in usposabljanja</p> <p>S1.4 Osnova za izvirna dognanja/stvaritve in kritično refleksijo</p>

Intended learning outcomes:

<p>Knowledge:</p> <p>Z1: Thorough professional theoretical and practical knowledge in the field of production management, supported by a broader theoretical and methodological basis.</p> <p>Skills:</p> <p>S1.1 Executing complex operational-professional tasks in the field of production management, that incorporate usage of methodological tools</p> <p>S1.2 Mastering demanding, complex work processes in production management while independently using knowledge in new situations.</p> <p>S1.3 Problem diagnostics and solving of management problems in various specific work environments related to education and training</p> <p>S1.4 Basis for unique innovations and critical reflection</p>
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Metode poučevanja in učenja:

<p>P1 Avditorna predavanja podprta s interaktivnim prikazom praktičnih primerov</p> <p>P3 Avditorne vaje z reševanjem praktičnih primerov</p> <p>P4 Laboratorijske vaje s timskim reševanjem aplikativnih problemov in uporabo programske opreme ter njihova predstavitev z razpravo.</p>

Learning and teaching methods:

<p>P1 Auditorial lectures supported by interactive presentation of practical examples</p> <p>P3 Auditorial exercises solving practical examples</p> <p>P4 Laboratory exercises with team solving of application problems, using software and presenting them with discussion.</p>

Načini ocenjevanja:

Delež/ Weight

Assessment:

- Teoretične vsebine (predavanja):	50,00 %	- Theoretical contents (lectures):
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- Samostojno delo na vajah:	25,00 %	- Independent work in exercises:
- Delo na laboratorijskih vajah (vključno s poročili):	25,00 %	- Laboratory work (including reports):

Reference nosilca/Lecturer's references:

Tomaž Berlec:

1. POTOČNIK, Primož, **BERLEC, Tomaž**, STARBEK, Marko, GOVEKAR, Edvard. Self-organizing neural network-based clustering and organization of production cells. Neural computing & applications, ISSN 0941-0643, May 2013, vol. 22, suppl. 1, str. 113-124, ilustr., doi: 10.1007/s00521-012-0938-x. [COBISS.SI-ID [12359195](#)], [JCR, SNIP]
2. **BERLEC, Tomaž**, POTOČNIK, Primož, GOVEKAR, Edvard, STARBEK, Marko. Forecasting lead times of production orders in SME's. Iranian journal of science and technology. Transaction B, Technology, ISSN 1028-6284, 2010, vol. 34, no. B5, str. 521-538. [COBISS.SI-ID [11657243](#)], [JCR, SNIP]
3. **BERLEC, Tomaž**, GOVEKAR, Edvard, GRUM, Janez, POTOČNIK, Primož, STARBEK, Marko. Predicting order lead times = Napovedovanje pretočnih časov. Strojniški vestnik, ISSN 0039-2480, 2008, letn. 54, št. 5, str. 308-321. [COBISS.SI-ID [10558235](#)], [JCR, SNIP]
4. JORDAN, Eva, **BERLEC, Tomaž**, STARBEK, Marko, KUŠAR, Janez. A lean production process : today's destination of companies. V: ZADNIK STIRN, Lidija (ur.), et al. SOR '15 proceedings, 13th International Symposium on Operational Research in Slovenia, Bled, Slovenia, September 23-25, 2015. Ljubljana: Slovenian Society Informatika, Section for Operational Research. 2015, str. 357-362, ilustr. [COBISS.SI-ID [14215451](#)]
5. **BERLEC, Tomaž**, STARBEK, Marko, KUŠAR, Janez. Going lean step by step. V: ČOSIĆ, Predrag (ur.), BARIĆ, Gordana (ur.), ĐUKIĆ, Goran (ur.). MOTSP 2014 : conference proceedings, 6th International Scientific Conference Management of Technology - Step to Sustainable Production, MOTSP 2014, 11-13 June 2014, Bol, Island Brac, Croatia, (Management of technology - Step to sustainable production ... (CD-ROM),ISSN 1848-5022, 6). Zagreb: Croatian Association for PLM. cop. 2014, datoteka 103-Berlec (9 f.), ilustr. [COBISS.SI-ID [13530907](#)]