

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet	Napredno načrtovanje in vodenje proizvodnje
Course title	Advanced Production Planning and Control

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnologije in sistemi v strojništvu/ 2. stopnja	Ni smeri študija	1. letnik	1.
Technologies and systems in mechanical engineering/ 2 nd Cycle	No study field	1 st year	1 st

Vrsta predmeta/Course type obvezni/core

Univerzitetna koda predmeta/University course code TSS 1 UN 2

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30		15	15		120	6

Nosilec predmeta/Lecturer: doc. dr. Tomaž Perme

Jeziki/	Predavanja/Lectures:	slovenski/Slovenian
Languages:	Vaje/Tutorial:	slovenski/Slovenian

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

Prerequisites:

<ul style="list-style-type: none"> Vpis v prvi letnik študijskega programa. Študent mora pred izpitom pripraviti in predstaviti ter zagovarjati projektno seminarsko nalogo. 	<ul style="list-style-type: none"> A prerequisite for inclusion is enrolment in the first year of study. Student has to prepare, present and defend a project seminar before the exam.
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Vsebina:

Content (Syllabus outline):

<ul style="list-style-type: none"> <i>Uvod.</i> Osnovni pojmi in definicije o proizvodnji: tehnologija in postopek, proizvodni proces, proizvodni dejavniki, proizvodni sistem in njegove funkcije, organizacijski vidiki proizvodnje, proizvodna sistematika in proizvodne strategije. <i>Pregled načrtovanja in vodenja proizvodnje.</i> Proizvodni program, 	<ul style="list-style-type: none"> <i>Introduction.</i> Basic concepts of production: technology and process, production process, production factors, production system and its functions, organizational aspects of production, production systematics and production strategies. <i>Overview of production planning and control.</i> Production program, planning
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<p>načrtovanje tehnoloških procesov in delovnih operacij, določitev tehnoloških časov, načrtovanje proizvodnih zmogljivosti, napovedovanje, časovni in vsebinski vidiki planiranja, izdelava proizvodnega plana, organizacija, vodenje in nadzor proizvodnje, metode za ekonomsko analizo in prikaz ključnih kazalnikov uspeha.</p> <ul style="list-style-type: none"> • <i>Načrtovanje proizvodnih zmogljivosti.</i> Ugotavljanje potreb, načrtovanje proizvodnih strojev, pripomočkov in naprav, načrtovanje logističnih in skladiščnih zmogljivosti, načrtovanje človeških virov, načrtovanje razmestitve opreme, organiziranje oskrbe proizvodnje z materialom in sredstvi, ter načrtovanje in organiziranje kontrole kakovosti in vzdrževanja. • <i>Napovedovanje in planiranje proizvodnega programa.</i> Pomen in namen napovedovanja, časovni horizont in značilnosti napovedovanja, kvantitativni in kvalitativni modeli in metode napovedovanja, namen in potek planiranja proizvodnega programa, postopki določanja proizvodnega programa. • <i>Planiranje proizvodnje.</i> Osnovno planiranje proizvodnje, planiranje materialnih potreb, planiranje zmogljivosti (kapacitet), terminsko planiranje (terminiranje). • <i>Vodenje in nadzor proizvodnje.</i> Proženje delovnih nalogov, razporejanje, delovna dokumentacija, razdeljevanje dela, oskrba z materialom in sredstvi, zajemanje podatkov iz proizvodnje, podatki za vodenje proizvodnje, spremljanje in analiza poteka proizvodnje. • <i>Načrtovanje in vodenje materialnega toka.</i> Načrtovanje in vodenje nabave, načrtovanje in vodenje zalog, optimalne in ekonomske količine naročanja, vodenje naročanja, oskrba proizvodnje z materialom in sredstvi, mrežno 	<p>of technological processes and work operations, determination of technological times, production capacity planning, forecasting, time and content aspects of planning, production planning, organization, production management and control, methods for economic analysis and presentation of key indicators of success.</p> <ul style="list-style-type: none"> • <i>Production capacity planning.</i> Identification of needs, production machinery, accessories and equipment planning, logistics and warehousing capacity planning, human resources planning, layout planning, organization of supply of materials and resources, planning and organization of quality control and maintenance. • <i>Forecasting and planning of the production program.</i> Meaning and purpose of forecasting, time horizon and characteristics of forecasting, quantitative and qualitative models and methods of forecasting, purpose and course of planning of the production program, processes for determining the production program. • <i>Production planning.</i> master production scheduling, material requirements planning, capacity requirements planning, scheduling. • <i>Production management and control.</i> Release work orders, scheduling, work documentation, distribution of work orders and documentation, supply of materials and resources, data collection from production, data for production planning and control, monitoring and analysis of the production. • <i>Material flow planning and control.</i> Procurement planning and control, inventory planning and control, optimal and economic order quantities, order processing and control, material and resource supply, network planning, value flow, modeling and simulation of material flow.
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<p>planiranje, tok vrednosti, modeliranje in simulacija toka materiala.</p> <ul style="list-style-type: none"> • <i>Metode naprednega planiranja in vodenje proizvodnje.</i> Značilnosti in pomanjkljivosti osnovnih metod planiranja materialnih potreb MRP in zmogljivosti MRPII, metode planiranja končnih in neskončnih zmogljivost, metoda z napredujočimi količinami, proženje delovnih nalogov glede na obremenitve, optimiziranje materialnega toka na podlagi omejitev ter vodenja po načinu vlečenja. 	<ul style="list-style-type: none"> • <i>Advanced planning and scheduling methods.</i> Characteristics and shortcomings of MRP and MRPII planning, methods of finite and infinite capacity planning, method with progress figures, load-oriented release of work orders, optimized production technology, and planning and control by pull principle.
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Temeljna literatura in viri/Readings:

Temeljna literatura/Basic literature

- LJUBIČ, T. *Planiranje in vodenje proizvodnje: modeli, metode, podatki.* Kranj: Založba Moderna organizacija, 2000. ISBN 961-232-090-X.
- PINEDO, Michael L. *Planning and scheduling in manufacturing and services [Elektronski vir].* New York: Springer Verlag, 2009. ISBN 978-1-4419-0910-7.
- NICHOLAS, John M. *Lean production for competitive advantage: a comprehensive guide to lean methodologies and management practices.* New York: Taylor & Francis Group, 2018. ISBN 978-1-4398-2096-4.
- KAVČIČ, Bogdan. *Upravljanje proizvodnje.* Novo mesto: Visoka šola za upravljanje in poslovanje, 2000. ISBN 961-6309-10-2.

Priporočljiva literatura/Recommended literature

- HARRISON, David K. in David J. PETTY. *Systems for Planning and Control in Manufacturing.* Oxford [etc.]: Butterworth-Heinemann: Newnes, 2002. ISBN 0-7506-4977-1.
- POLAJNAR, Andrej. *Priprava proizvodnje.* Maribor: Univerza v Mariboru, Fakulteta za strojništvo, 2006. ISBN 86-435-0807-1.

Cilji in kompetence:

Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:

- sposobnost samostojnega in ustvarjalnega raziskovalno-razvojnega dela na področju strojništva,
- sposobnost samostojnega spremljanja in kritične presoje najnovejših dosežkov s področja strojništva in širše,
- sposobnost aktivnega pisnega in ustnega sporazumevanja na visoki strokovni kot

Objectives and competences:

The learning unit mainly contributes to the development of the following general and specific competences:

- ability of independent and creative research and development work in the field of mechanical engineering,
- ability to independently perceive and critically assess the latest achievements in the field of mechanical engineering and beyond,

<p>tudi na poljudni ravni, odvisno od ciljnega občinstva,</p> <ul style="list-style-type: none"> • sposobnost timskega dela s strokovnjaki z različnih področij, • sposobnost učinkovite uporabe informacijsko-komunikacijske tehnologije, • sposobnost prevzeti odgovornost za lasten poklicni in osebni razvoj, • sposobnost delovanja v sozvočju s poklicno, okoljsko, socialno in etično odgovornostjo, • poznavanje in razumevanje načrtovanja in vodenja proizvodnje, • obvladovanje izbranih metod in orodij za načrtovanje in vodenje proizvodnje, • sposobnost reševanja konkretnih problemov s področja načrtovanja in vodenja proizvodnje. 	<ul style="list-style-type: none"> • ability to actively communicate in writing and orally at a high professional as well as at a popular level, depending on the target audience, • ability to work in teams with experts from different fields, • ability to effectively use information and communication technology, • ability to take responsibility for one's own professional and personal development, • ability to work according to professional, environmental, social and ethical responsibility, • knowledge and understanding of production planning and control, • mastery of selected methods and tools for production planning and control, • ability to solve problems in the field of production planning and control.
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Predvideni študijski rezultati:

Študent/študentka:

- pozna postopke, metode in orodja za načrtovanje proizvodnje,
- pozna metode in orodja za planiranje, vodenje in nadzor proizvodnje,
- razume namen, vlogo in uporabo naprednih postopkov in orodij za načrtovanje in vodenje sodobne proizvodnje,
- razvije znanja in sposobnosti za izbiro primernih metod in orodij za načrtovanje in vodenje proizvodnje,
- se usposobi za uporabo naprednih inženirskih orodij in digitalnih rešitev za načrtovanje in vodenje proizvodnje,
- zna kritično presojati in analizirati ter predvidevati uporabo novih dognanj in rešitev na področju načrtovanje in vodenje proizvodnje.

Intended learning outcomes:

Students:

- know the methods, procedures and tools for production planning,
- know the methods, procedures and tools for production planning and control,
- understand the purpose, role and use of advanced methods and tools for planning and control modern production,
- develop knowledge and skills for selection of appropriate method and tools for production planning and control,
- develop skills in the use of advanced engineering tools and digital solutions for production planning and control,
- are able to critically assess and analyse, and anticipate the use of new findings and solutions in the field of production planning and control.

Metode poučevanja in učenja:

- *predavanja* z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov),
- *avditorne vaje*: reševanje problemov, študije primerov, kritično presojanje, diskusija, refleksija izkušenj, vrednotenje, projektno delo, timsko delo,
- *laboratorijske vaje*: praktično reševanje več tipičnih problemov v laboratoriju (na računalniku),
- *seminar*: priprava, predstavitev in uspešen zagovor projektne/raziskovalne naloge, (reševanje problemov, študije primera, kritično presojanje, diskusija, refleksija izkušenj, vrednotenje, projektno delo, timsko delo).

Learning and teaching methods:

- *lectures* with active student participation (explanation, discussion, questions, examples, problem solving),
- *tutorial*: problem solving, case studies, methods of critical thinking, discussion, reflection of experience, evaluation, project work, team work,
- *laboratory work*: practical solving of several typical problems in laboratory (on a computer),
- *seminar tutorial*: presentation and defence of project/research work (problem solving, studies, critical thinking, discussion, reflection of experience, evaluation, project work, team work).

Načini ocenjevanja:

Načini:		
• pisni izpit	60 %	
• ustni izpit	20 %	
• projektno seminarsko delo	20 %	
Ocenjevalna lestvica: ECTS.		

Delež (v %)

Weight (in %)

Assessment:

Types:	
• written exam	
• oral examination	
• project seminar	
Grading scheme: ECTS.	