

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Konstruiranje
Course title:	Design

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnologije in sistemi – prva stopnja	Tehnologije in sistemi	tretji	peti
Technologies and systems – 1st cycle	Technologies and systems	third	fifth

Vrsta predmeta / Course type Modularni/modular

Univerzitetna koda predmeta / University course code: TS M2 UN1

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Laboratorijske vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		15	15		100	6

Nosilec predmeta / Lecturer: doc. dr. Marko Vrh

Jeziki / Languages:	Predavanja / Lectures:	slovenski, angleški
	Vaje / Tutorial:	slovenian, english

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

- Vpis v tretji letnik študija

Prerequisites:

- Enrollment in the third year of study

Vsebina:

- *Sodobne metode za konstruiranje* (funkcije in podfunkcije izdelka, delovni principi, metode iskanja konceptnih rešitev, snovanje, razdelava).
- *Osnove timskega dela, sočasnega inženirstva in projektnega vodenja*
- *Ostali pomembni vidiki iskanja konstrukcijske rešitve* (ekonomičnost, material, proizvodni proces, sestavljanje in razstavljanje, kakovost in zanesljivost, vzdržljivost in vzdrževanje, okoljski vplivi, reciklaža).

Content (Syllabus outline):

- *Modern methods of construction* (functions and sub-functions of the product, work principles, methods of finding conceptual solutions, design, elaboration).
- *Fundamentals of teamwork, concurrent engineering and project management*
- *Other important aspects in finding a design solution* (economy, material, production process, assembly and disassembly, quality and reliability, durability and maintenance, environmental impact, recycling).

- *Praktične smernice konstruiranja ulitkov, odkovkov, delov proizvedenih z odrezavanjem, 3D printanih izdelkov, brizganih izdelkov iz umetnih mas, kompozitov, izdelkov iz pločevine in zvarjencev*
- *Iskanje konceptnih rešitev s pomočjo računalniških metod in optimizacija izdelkov (Sodobne metode numerične optimizacije izdelkov z računalnikom).*

Vaje

Na vajah študenti uporabijo pridobljena znanja pri predavanju na reševanju praktičnih problemov.

- *Practical guidelines for designing castings, forgings, die-cut parts, 3D printed products, injection molded products, composites, sheet metal products and weldments*
- *Finding conceptual solutions using computer methods and product optimization (Modern methods of numerical product optimisation with computer).*

Tutorials

In the tutorials, students apply the knowledge acquired in the lecture to solve practical problems.

Temeljni literatura in viri / Readings:

Temeljna literatura/Basic literature

Pehan, S. (2005). *Metodika konstruiranja*. Maribor: Univerza v Mariboru

Priporočljiva literatura/Recommended literature

McMahon, C., Browne, J. (1998) "*CAD/CAM – Principles, practice and manufacturing management*". Addison Wesley.

Anderson, D. M. (2004) *Design for manufacturability & concurrent engineering*. CIM press.

Cather, H. et al. (2001) *Design engineering*. Butterworth Heinemann.

Otto, K. N., Wood, K. L. (2001) *Product design*. Prentice Hall.

Ulrich, K. T., D. Steven (2003). *Eppinger: »Product design and development«*. New York: McGraw-Hill.

Novejši članki v revijah ali spletu.

Cilji in kompetence:

Osnovni cilj je razumevanje metod in načel konstruiranja, seznanjanje s smernicami za doseganje kakovostnih konstrukcijskih rešitev ter vloga in pomen sodobnih računalniških orodij pri konstruiranju in ovrednotenju rešitev.

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

- sposobnost evidentiranja problema in njegove analize ter predvidevanja operativnih rešitev v tehnološkem smislu ali v procesu organizacije in vodenja,
- sposobnost obvladovanja standardnih razvojnih metod, postopkov in procesov,

Objectives and competences:

The basic objective is to understand the methods and principles of construction, to become familiar with the guidelines for achieving high-quality construction solutions, and the role and importance of modern computer tools in the construction and evaluation of solutions.

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

- the ability to grasp and analyse a problem, as well as foresee operational solutions in the technological sense or in the process of organisation and management,

- sposobnost uporabe pridobljenega teoretičnega znanja v praksi,
- sposobnost obvladovanja razvoja in napredka,
- avtonomnost v strokovnem delu s področja tehnologij in sistemov,
- sposobnost razumevanja in uporabe sodobnih teorij s področja tehniških, tehnoloških in naravoslovnih ved,
- sposobnost interdisciplinarnega povezovanja znanja,
- sposobnost stalne uporabe informacijske in komunikacijske tehnologije na svojem strokovnem področju,
- poznavanje, uporabljanje in spremljanje metode celovite kakovosti tehnologij, proizvodnje in logistike.

- the ability to master standard development methods, procedures and processes,
- the ability to use acquired theoretical knowledge in practice,
- autonomy in professional work in the field of technologies and systems,
- the ability to understand and apply modern theories in the fields of technical, technological and natural sciences,
- the ability to integrate knowledge in an interdisciplinary manner,
- the ability to continuously use information and communication technology in one's professional field,
- knowledge, application and monitoring of the comprehensive quality method for technologies, production and logistics.

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent/študentka:

- pozna in uporablja konstrukcijske metode za konstruiranje novih proizvodov;
- pozna in razume aktivnosti procesa hkratnega inženiringa in podporo računalnika v vseh fazah razvoja izdelka,
- pozna in razume vlogo sistematičnega hkratnega pristopa pri zagotavljanju konstrukterskih ciljev,
- pozna in razume ovrednotenje in izbiro med konstrukcijskimi rešitvami,
- pozna hkratno delo v projektni skupini.
- povezuje in rešuje konstrukcijske probleme z drugimi tehniškimi vsebinami in fizikalnimi efekti,
- pozna in razume uvrščanje strokovnega področja v okolico po funkcionalnosti varovanja okolja,
- lahko vodi razvojne naloge na področju strojnih naprav in sistemov,
- lahko snuje in konstruira sisteme v strojogradnji, medicini in robotiki,
- je usposobljen za samostojno reševanje konstrukcijskih nalog.

Intended learning outcomes:

Knowledge and understanding:

Student:

- knows and uses design methods for the design of new products;
- knows and understands the activities of the simultaneous engineering process and computer support in all phases of product development,
- knows and understands the role of a systematic simultaneous approach to ensure design objectives are met,
- knows and understands the evaluation and choice between construction solutions,
- knows how to work simultaneously in a project team.
- connects and solves design problems with other technical content and physical effects,
- knows and understands the classification of the professional field in the environment according to the functionality of environmental protection,
- can lead development tasks in the field of hardware devices and systems,
- can design and construct systems of mechanical engineering, medicine and robotics,

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- is able to solve design tasks independently.

Metode poučevanja in učenja:

- frontalna multimedijška predavanja,
- reševanje in predstavitev domačih nalog
- vaje in projektna naloga.

Learning and teaching methods:

- frontal multimedia lectures,
- solving and presenting homework
- tutorials and project assignment.

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): <ul style="list-style-type: none">• opravljene domače naloge• predstavitev projektne naloge• pisni in ustni izpit Ocenjevalna lestvica: ECTS.	20% ocene 30% ocene 50% ocene	Type (examination, oral, coursework, project): <ul style="list-style-type: none">• completed homework• presentation of the project assignment• written and verbal exam Grading scale: ECTS.