

**UČNI NAČRT PREDMETA / COURSE SYLLABUS****Predmet:** CAE – Računalniško podprt inženiring**Course title:** CAE – Computer Aided Engineering

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnologije in sistemi – prva stopnja	/	drugi	četrti
Technologies and Systems – 1st cycle	/	second	fourth

**Vrsta predmeta / Course type**

obvezni/obligatory

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

TS 2 UN 6

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Laboratorijske vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45			30		135	7

**Nosilec predmeta / Lecturer:**

prof. dr. Andrej Lipej, Matej Štefanič, pred.

**Jeziki /****Languages:****Predavanja /****Lectures:**

Slovenski/Slovenian

**Vaje / Tutorial:**

Slovenski/Slovenian

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

- poznavanje sistemov CAD.

**Prerequisites:**

- familiarity with CAD systems.

**Vsebina:**

- *Uvod v virtualni inženiring* (definicije, značilnosti) s poudarkom na MKE in CFD.
- *Arhitektura in komponente sistemov CAE.*
- *Osnove MKE in osnove procesa analize konstrukcijskih elementov.*
- *Analize in simulacije izdelkov za vrednotenje.*
- *Osnove CFD in proces analize.*
- *Integriran razvoj virtualnega izdelka.*

**Content (Syllabus outline):**

- *Introduction to virtual engineering* (definitions, characteristics) with emphasis on FEM and CFD.
- *Architecture and components of CAE systems.*
- *The basics of FEM and the basics of the analysis process of structural elements.*
- *Analysis and simulations of products for evaluation.*
- *Basics of CFD and the analysis process.*
- *Integrated virtual product development.*

### Temeljni literatura in viri / Readings:

Muhič, S. (2009) *Računalniško podprt inženiring v okolju ANSYS Workbench*.  
McMahon, C. and Browne, J. (1998) *CAD/CAM – principles, practice and manufacturing management*. Addison Wesley.  
Burdea, G. C., Coiffet, P. (2003) *Virtual reality technology, 2nd edition*. IEEE PRES.  
Dai, F. (Editor) (1997) *Virtual reality for industrial applications (Computer graphics – systems and applications)*. Springer.  
Ulrich, K. T., Eppinger, S. D. (2003) *Product design and development*. McGraw-Hill.  
Crnkovic, U. A., Dahlqvist, A. P. *Implementing and integrating product data management and software configuration management*. Artech House, Inc.  
Novejši članki v revijah ali na spletu

### Cilji in kompetence:

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

- sposobnost evidentiranja problema in njegove analize ter predvidevanja operativnih rešitev v tehnološkem smislu,
- sposobnost obvladovanja standardnih razvojnih metod, postopkov in procesov
- sposobnost uporabe pridobljenega teoretičnega znanja v praksi,
- sposobnost obvladovanja razvoja in napredka,
- avtonomnost v strokovnem delu s področja tehnologij in sistemov,
- uporaba strokovnega tujega jezika v ustni in pisni obliki,
- kooperativnost, usposobljenost za timsko delo,
- sposobnost razumevanja in uporabe sodobnih teorij s področja tehniških, tehnoloških in naravoslovnih ved,
- sposobnost interdisciplinarnega povezovanja znanja,
- sposobnost reševanja konkretnih delovnih problemov na področju tehnologij in sistemov z uporabo standardnih strokovnih metod in postopkov,
- razvoj strokovnih veščin in spretnosti na področju tehnologij in sistemov,
- sposobnost stalne uporabe informacijske in komunikacijske tehnologije na svojem strokovnem področju

### Objectives and competences:

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

- the ability to identify a problem and analyze it, as well as anticipate operational solutions in a technological sense,
- the ability to master standard development methods, procedures and processes,
- the ability to use acquired theoretical knowledge in practice,
- the ability to manage development and progress,
- autonomy in professional work in the field of technologies and systems,
- use of a professional foreign language in oral and written form,
- cooperativeness, teamwork skills,
- 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 solve specific work problems in the field of technologies and systems using standard professional methods and procedures,
- development of professional skills and abilities in the field of technologies and systems,
- the ability to continuously use information and communication technology in one's professional field,

- usposobljenost za svetovalno delo (prenos znanja),
- aktivno kritično spremljanje razvoja novih metod uporabe materialov na področju tehnologij in sistemov s poudarkom na ekologiji.

- qualification for consulting work (transfer of knowledge),
- active critical monitoring of the development of new methods of using materials in the field of technologies and systems with an emphasis on ecology and sustainable development.

**Predvideni študijski rezultati:**

- Znanje in razumevanje:  
*Študent/študentka:*
- pozna in razume aktivnosti pri razvoju izdelkov in podporo računalnika v vseh fazah razvoja izdelka,
  - pozna in razume vlogo in zmožnosti CAE (virtualnega inženirstva) v razvoju izdelka, s poudarkom na strukturnih analizah in analizah numerične dinamike tekočin,
  - pozna standardna programska orodja in standardne formate za prenos iz orodij za modeliranje v sisteme CAE,
  - kakovostno ovrednoti pridobljene rezultate.

**Intended learning outcomes:**

- Knowledge and understanding:  
*Student:*
- knows and understands product development activities and computer support in all phases of product development,
  - knows and understands the role and capabilities of CAE (virtual engineering) in product development, with emphasis on structural analysis and computational fluid dynamics,
  - knows standard software tools and standard formats for the transfer of modelling tools into CAE systems,
  - qualitatively evaluates the results obtained.

**Metode poučevanja in učenja:**

- frontalna multimedijaska predavanja,
- reševanje domačih nalog,
- projektna naloga.

**Learning and teaching methods:**

- face-to-face multimedia lectures,
- solving homework,
- Project work.

Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt):	Delež (v %) / Weight (in %)	Type (examination, oral, coursework, project):
<ul style="list-style-type: none"> <li>• opravljena seminarska naloga</li> <li>• zagovor seminarske naloge</li> <li>• pisni (ustni) izpit</li> </ul>	50% ocene 20% ocene 30% ocene	<ul style="list-style-type: none"> <li>• Completed seminar assignment</li> <li>• defense of the seminar thesis</li> <li>• written (oral) exam</li> </ul>
Ocenjevalna lestvica: ECTS.		Grading scale: ECTS.