



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Snovanje in konstruiranje

Course title: Engineering design

| Študijski program in stopnja Study programme and level | Študijska smer Study field | Letnik Academic year | Semester |
|---|-------------------------------|-------------------------|-----------------|
| Enovit magistrski študijski program Predmetni učitelj 2. stopnje | Izobraževalna tehnika | 1 | Letni Summer |
| Five-year master's degree program Subject Teacher | Technical education | | |

Vrsta predmeta / Course type

Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

| Predavanja Lectures | Seminar Seminar | Vaje Tutorial | Lab. vaje Laboratory work | Terenske vaje Field work | Samost. delo Individ. work | ECTS |
|------------------------|--------------------|------------------|------------------------------|-----------------------------|-------------------------------|------|
| 45 | 10 | | 15 | | 80 | 5 |

Nosilec predmeta / Lecturer:

Srečko Glodež

Jeziki / Predavanja / Lectures: slovenski / slovene

Languages: Vaje / Tutorial: slovenski / slovene

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

Ni posebnih pogojev.

Prerequisites:

No special prerequisites.

Vsebina:Predavanja:

- statika (sile, moment, ravninski nosilci, težišče, geometrijske karakteristike prerezov, trenje na kolutih)
- trdnost (napetosti in deformacije, Hookov zakon, osnovne obremenitve (nateg, tlak, upogib, strig, vzvoj, uklon), sestavljene obremenitve, porušne hipoteze, trdnostne lastnosti inženirski gradiv pri statičnih in dinamičnih obremenitvah, varnostni koeficienti.
- predstavitev osnovnih pojmov o konstruiranju;
- obravnava posameznih faz konstruiranja;
- sodobni trendi na področju konstruiranja (optimiranje, ergonomija, estetika, etika).

Vaje in seminar:

- reševanje praktičnih problemov;
- izdelava seminarske naloge.

Content (Syllabus outline):Lectures:

- statics (forces, torque, surface beams, gravity centres, geometric characteristics of cross sections, friction on discs);
- strength (stresses and deformations, Hook's law, base loads (tension, compression, bending, shear torsion, buckling), combined loading, failure criteria, strength properties of engineering materials by static and dynamic loading, safety factors.
- presentation of basic engineering design concepts;
- analysis of separated design steps;
- modern trends in design procedure (optimisation, ergonomics, aesthetics, ethics).

Tutorials and seminar:

- solving of practical problems;
- seminar work.

Temeljni literatura in viri / Readings:

1. Alujevič A., Harl B.: Mehanika I, FS UM, 2006.
2. Gere R.C.: Mechanics of materials, Thomson, 2004.
3. Pehan S.: Metodika konstruiranja, FS UM, 2005.
4. Hlebanja J.: Metodika konstruiranja, FS UM, 2003.
5. Cross N.: Engineering design Methods, John Wiley & Sons, 2001.
6. SIST, ISO, EN in DIN standardi s področja konstruiranja.

Cilji in kompetence:

- podati osnovno znanje s področja statike in trdnosti;
- spoznati metode in pristope posameznih faz konstruiranja;
- prikazati proces konstruiranja na konkretnih praktičnih primerih;

Objectives and competences:

- to provide the base knowledge of statics and strength;
- to study methods and approaches of all phases of engineering design;
- to demonstrate the design process on the real practical problems;

Predvideni študijski rezultati:**Znanje in razumevanje:**

- razumevanje osnovnih pojmov in principov statike in trdnosti;

Intended learning outcomes:**Knowledge and understanding:**

- understanding of basic concept and principles of statics and strength;

| |
|---|
| <ul style="list-style-type: none"> • razumevanje metod in pristopov v posameznih fazah konstruiranja; • razumevanje vplivnih parametrov v procesu razvoja izdelka; <p>Prenesljive/ključne spretnosti in drugi atributi:</p> <ul style="list-style-type: none"> • kombinirana uporaba znanj iz statike in trdnosti pri reševanju praktičnih problemov; • razvoj novih idej in izdelkov. |
|---|

| |
|--|
| <ul style="list-style-type: none"> • understanding of methods and approaches of all phases of engineering design; • understanding of influential parameters within product development process. <p>Transferable/Key Skills and other attributes:</p> <ul style="list-style-type: none"> • combined use of knowledge of statics and strength to solve practical problems; • development of the new ideas and products. |
|--|

Metode poučevanja in učenja:

Learning and teaching methods:

| |
|--|
| <ul style="list-style-type: none"> • frontalna predavanja; • računalniške vaje; • samostojno delo – izdelava in predstavitve seminarja. |
|--|

| |
|---|
| <ul style="list-style-type: none"> • Frontal lectures; • computer work; • individual work - seminar. |
|---|

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

| | | |
|---|-------------------------------------|---|
| <ul style="list-style-type: none"> • pisni izpit; • seminarska naloga; • opravljene domače naloge. | <p>40 %</p> <p>40 %</p> <p>20 %</p> | <ul style="list-style-type: none"> • written exam; • seminar work; • completed coursework. |
|---|-------------------------------------|---|

Reference nosilca / Lecturer's references:

| |
|---|
| <ol style="list-style-type: none"> 1. Glodež S.: Tehniško risanje, TZS, Ljubljana 2005. 2. Glodež S., Potočnik R, Flašker J.. Computational model for calculation of static capacity and lifetime of large slewing bearing's raceway. <i>Mech. mach. theory.</i>, 2012, vol. 47, str 16-30. 3. Drobne M., Göncz P., Glodež S.. High cycle fatigue parameters of high chromium steel. <i>Key eng. mater.</i>,2011, str. 299-302 4. Göncz P., Glodež S.: Calculation model for pre-stressed bolted joints of slewing bearings. <i>Advanced engineering</i>, 2009, year 3, no. 2, str. 175-186 5. Flašker J., Glodež S., Ren Z.: Zobniška gonila, Pasadena, 2010. |
|---|