SYLLABUS

<table>
<tr><td colspan="2">Course name: IENG 102 Introduction to Materials Science and Nanotechnology</td><td colspan="3">Department: Materials Engineering</td></tr>
<tr><td rowspan="3">Year/Semester</td><td colspan="3">Methods of Education</td><td>Credit (ECTS)</td></tr>
<tr><td>Lecture (h/week)</td><td>Project/ Field Study</td><td>Quiz (#/semester)</td><td rowspan="2">4</td></tr>
<tr><td>2021-2022/ Spring Semester</td><td>3</td><td>1</td><td>2</td></tr>
<tr><td>Language</td><td colspan="4">English</td></tr>
<tr><td>Compulsory (C) /Elective (E)</td><td colspan="4">C</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td>Course Contents</td><td colspan="4">• Introduction to materials science and engineering.
• Atomic structure and interatomic bonding.
• The structure of crystalline solids.
• Imperfections in solids.
• Mechanical properties of materials.
• Failure.
• Properties and applications of materials.
• Overview of nanotechnology and nanomaterials.</td></tr>
<tr><td>Course Objectives</td><td colspan="4">• Provide basics in materials science and nanotechnology; crystal structures, imperfections in solid structures, mechanical properties of materials, failure mechanism, nanotechnology and nanomaterials.</td></tr>
<tr><td>Learning Outcomes and Competences</td><td colspan="4">• Compute the relation between properties, micro-structure, and processing of ferrous and non-ferrous materials.
• Demonstrate ability to compose a paper (term project).</td></tr>
<tr><td>Textbook and /or References</td><td colspan="4">Course Book:
• William D. Callister, David G. Rethwisch, Material Science and Engineering, 9th Edition, SI Version, Wiley, 2016.
Other Books:
• William D. Callister, David G. Rethwisch, Fundamentals of Materials Science and Engineering, 5th Edition, SI Version, Wiley, 2016.
• Donald R. Askeland, The Science and Engineering of Materials, 7th Edition, Cengage Learning, 2015.</td></tr>
<tr><td rowspan="8">Assessment Criteria</td><td></td><td>If any, mark as (X)</td><td>Percentage (%)</td></tr>
<tr><td>Midterm Exams</td><td>(X)</td><td>30</td></tr>
<tr><td>Quiz</td><td>(X)</td><td>10</td></tr>
<tr><td>Homework</td><td></td><td></td></tr>
<tr><td>Projects</td><td>(X)</td><td>10</td></tr>
<tr><td>Laboratory work</td><td></td><td></td></tr>
<tr><td>Final Exam</td><td>(X)</td><td>50</td></tr>
<tr><td>Instructor</td><td colspan="4">Assist. Prof. Dr. Hande YAVUZ</td></tr>
<tr><td>Week</td><td colspan="4">Subject</td></tr>
<tr><td>1</td><td colspan="4">Introduction to materials science and engineering.</td></tr>
<tr><td>2-3</td><td colspan="4">Atomic structure and interatomic bonding.
The structure of crystalline solids.</td></tr>
<tr><td>4</td><td colspan="4">Imperfections in solids.</td></tr>
<tr><td>5-7</td><td colspan="4">Mechanical properties of materials: concepts of stress-strain, elastic deformation, plastic deformation, hardness.
Week 6: Quiz #1</td></tr>
<tr><td>8</td><td colspan="4">MT Exam</td></tr>
<tr><td>9-13</td><td colspan="4">Failure: fracture, fatigue, creep.
Week 13: Quiz #2</td></tr>
<tr><td>14</td><td colspan="4">Properties and applications of materials.</td></tr>
<tr><td>15</td><td colspan="4">Overview of nanomaterials and nanotechnology.</td></tr>
<tr><td>16</td><td colspan="4">Final Exam</td></tr>
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