Subject Matter: Geometrical and Physical Optics

Code/Credit: FIS 318/3

Prerequisite: Vibration and wave

Competences: After completing this course, student should have ability and be able to understand, analyze and to achieve concepts of geometrical and physical optics in daily activities.

Description: This course will give fundamental concepts about nature of light, geometrical optics (reflection, refraction, thin and cylindrical lens) and physical optics (interference, diffraction and polarization of light).

References:


Learning Activities

<table>
<thead>
<tr>
<th>Day</th>
<th>Section</th>
<th>Part</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 1,2 | Introduction | a. Nature of light  
b. Brief history of light  
c. Particles and photons  
d. The Electromagnetic spectrum | Discussion, assignments and test |
| 3,4 | Law of reflection | a. Law of reflection  
b. Snell’s Law  
c. Huygen’s principle  
d. Fermat’s principle | Discussion, assignments and test |
| 5   | Reflection | a. Reflection in plane mirrors  
b. Reflection at a spherical surface | Discussion, assignments and test |
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Details</th>
<th>Format</th>
</tr>
</thead>
</table>
| 6,7  | Refraction | a. Refraction through plane surfaces  
b. Refraction at a spherical surface | Discussion, assignments and test |
| 8    | Midtest | | |
| 9    | Thin Lenses | a. Introduction to thin lenses  
b. Newtonian equation for the thin lenses | Discussion, assignments and test |
| 10   | Cylindrical lenses | a. Concave cylindrical lenses  
b. Convex cylindrical lenses | Discussion, assignments and test |
| 11,12| Interference of light | a. Two-beam interference  
b. Newtons’ Rings | Discussion, assignments and test |
| 13   | Diffraction | a. Fraunhofer diffraction  
b. The Diffraction grating  
c. Fresnel diffraction | Discussion, assignments and test |
| 14,15| Polarization | a. Mathematical representation of polarized light  
b. Polarization by selective absorption  
c. Polarization by scattering  
d. Double refraction | Discussion, assignments and test |
| 16   | Optical Instrumentation | a. Eyes  
b. Prisms  
c. The Camera  
d. Microscope  
e. Telescope | Discussion, assignments and test |

**Evaluation:**

<table>
<thead>
<tr>
<th>Components</th>
<th>Portion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Attendance</td>
<td>10%</td>
</tr>
<tr>
<td>Participation</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm examination</td>
<td>25%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>25%</td>
</tr>
</tbody>
</table>