



Syllabus

Term: 2021/22/1 **Subject name:** Basic Laws, Equations and Models 3. **Subject code:** IVB290ANVM

Unit (Unit code) (MIK-IV)

Lecturer responsible for the course: Dr. NYITRAY Gergely

Requirement: Mid-semester grade

Classes per week : 1/2/0/0

Classes per term: 5/10/0/0

Purpose of education:

The aim of this course is to present the basic concepts of classical optics. The topics are the following: Geometric Optics, Photometric Units, Interference of Light, Interferometers, Diffraction of Light, Polarization of Light, Interaction of Electromagnetic Waves with a Substance, Waveguides and Optical Fibers, Lasers

Contents:

The Refractive Index, Optical Path, Laws of Reflection and Refraction. Fermat's Principle, The Critical Angle and Total Reflection, Plane-Parallel Plate. Refraction by a Prism, Thin Lenses, Image Formation, Spherical Mirrors. Optical Instruments, The Human Eye, Microscopes, Astronomical Telescopes. The Interference of Two Beams of Light, Huygens's Principle, Young's Experiment. Fresnel's Biprism, Interferometric Measurements of Length, Interferometers. Interference Involving Multiple Reflections, Newton's Rings, Fabry-Perrot Interferometer. Fresnel and Fraunhofer Diffraction, Rectangular Aperture, Circular Aperture. Resolving Power of a Telescope and Microscope, The Diffraction Grating. The Electromagnetic Character of Light, Light Vector in an Electromagnetic Wave. Energy and Intensity of the Electromagnetic Wave, The Polarization of Light. Waveguides: Planar, Rectangular, Circular, Optical Fibers; Lasers.

System of examing and valuation:

20% - Homework (HW)

80% - Writing Exam (2*WE)

Grade - (HW+WE)/2

89%-100%-5; 77%-88%-4; 66%-76%-3; 55%-65%-2



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Bibliography:

Gambiattista, Richardson, Richardson: "College Physics" McGraw-Hill International Edition 2007 ISBN-13 978-0-07-110608-5

David J. Griffiths "Introduction to Electrodynamics" 2008 Pearson Education, Inc. publishing as Pearson Benjamin Cummings ISBN 0-13-919960-8
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