COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR ... SEMESTER ...

Course title	*Basic laws, Equations and Models 3.*
Course Code	***IVB290ANVM***
Hours/Week: le/pr/lab	***1/2/0***
Credits	***3***
Degree Programme	***Electrical engineering BSc***
Study Mode	***full-time***
Requirements	***Mid-semester grade***
Teaching Period	***Autumn***
Prerequisites	***-***
Department(s)	***Department of Automation***
Course Director	***Dr. NYITRAY Gergely***
Teaching Staff	***Kovács Attila***

COURSE DESCRIPTION

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

SYLLABUS

1. GOALS AND OBJECTIVES

Upon completion of this course, the student should be able to: interpret, and put into practice formulas and phenomena from the topic of optics and electromagnetic waves.

2. COURSE CONTENT

	TOPICS
LECTURE/PRACTICE	1. The Refractive Index, Optical Path, Laws of Reflection and Refraction. Fermat's Principle, The Critical Angle and Total Reflection, Plane-Parralel 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, Rectengular, Circular, Optical Fibers; Lasers.

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Introduction: Course description. Orientation. The Rectilinear Propagation of Light, The Refractive Index, Optical Path, Laws of Reflection and Refraction		-	-
2.	Fermat's Principle, The Critical Angle and Total Reflection		-	-
3.	Plane-Parallel Plate, Refraction by a Prism, Thin Lenses, Image Formation, Spherical Mirrors		-	-
4.	Optical Instruments, The Human Eye, Microscopes, Astronomical Telescopes		-	-
5.	The Interference of Two Beams of Light, Huygens Principle, Young's Experiment		-	-
6.	Fresnel's Biprism, Interferometric Measurements of Length, Interferometers		-	-
7.	Interference Involving Multiple Reflections, Newton's Rings, Fabry-Perrot Interferometer		-	-
8.	Fresnel and Fraunhofer Diffraction		-	-
9.	Break		-	-
10.	Rectangular Aperture, Circular Aperture		-	-
11.	Resolving Power of a Telescope and Microscope, The Diffraction Grating		-	-
12.	The Electromagnetic Character of Light, Light Vector in an Electromagnetic Wave		-	-
13.	Energy and Intensity of the Electromagnetic Wave, The Polarization of Light		-	-
14.	Waveguides: Planar, Rectengular, Circular, Optical Fibers		-	-
15.	Lasers		-	-

PRACTICE, LABORATORY PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Introduction: Course description. Orientation. The Rectilinear Propagation of Light, The Refractive Index, Optical Path, Laws of Reflection and Refraction		-	-
2.	Fermat's Principle, The Critical Angle and Total Reflection		Möbius	4th week
3.	Plane-Parallel Plate, Refraction by a Prism, Thin Lenses, Image Formation, Spherical Mirrors		Möbius	5th week
4.	Optical Instruments, The Human Eye, Microscopes, Astronomical Telescopes		Möbius	6th week
5.	The Interference of Two Beams of Light, Huygens Principle, Young's Experiment		Möbius	7th week
6.	Fresnel's Biprism, Interferometric Measurements of Length, Interferometers		Möbius	8th week
7.	Interference Involving Multiple Reflections, Newton's Rings, Fabry-Perrot Interferometer		Möbius	9th week
8.	1st WE		-	-
9.	Break		-	-

10.	Resolving Power of a Telescope and Microscope, The Diffraction Grating		Möbius	12th week
11.	The Electromagnetic Character of Light, Light Vector in an Electromagnetic Wave		Möbius	13th week
12.	Energy and Intensity of the Electromagnetic Wave, The Polarization of Light		Möbius	14th week
13.	Waveguides: Planar, Rectengular, Circular, Optical Fibers LASER		Möbius	15th week
14.	2nd WE		-	-
15.	RE-TAKE		-	-

3. ASSESSMENT AND EVALUATION

(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

Attendance sheet.

ASSESSMENT

Course resulting in mid-term grade *(PTE TVSz 40§(3))*

Mid-term assessments, performance evaluation and their ratio in the final grade *(The samples in the table to be deleted.)*

Type	Assessment	Ratio in the final grade
Test 1	*45*	*50 %*
Test 2	*45*	*eg. 30 %*
homework	*-*	*-*

Opportunity and procedure for re-takes (PTE TVSz 47§(4))

The specific regulations for improving grades and resitting tests must be read and applied according to the general Code of Studies and Examinations. E.g.: all tests and assessment tasks can be repeated/improved at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

Each WE's results can be improved by a Re-take once during the study period.
1 final opportunity will be on the first week of the Exams Period, as a Signature Re-take Exam.

Grade calculation as a percentage

based on the aggregate performance according to the following table

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % ... 85 %
satisfactory (3)	55 % ... 70 %
pass (2)	40 % ... 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE

In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)

COMPULSORY READING AND AVAILABILITY

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

[2.] David J. Griffiths “Introduction to Electrodynamics” 2008 Pearson Education, Inc.publishing as Pearson Benjamin Cummings ISBN 0-13-919960-8

RECOMMENDED LITERATURE AND AVAILABILITY

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