COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF APPLIED ARTS & CULTURE		
ACADEMIC UNIT	DEPARTMENT OF GRAPHIC AND VISUAL COMMUNICATION DESIGN		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**N1-3030**	SEMESTER	3
COURSE TITLE	**PHYSICS-OPTICS**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
Lectures	2	
Laboratory Exercises	2	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	4	5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course aims at:
a) to provide basic knowledge of General Physics with a localized interest in Optics,
b) to provide those specialized knowledge of physics, on which modern methods with applications in Graphic Arts Technology are based; and
c) in general, to acquaint the student with technology, the rational way of thinking and the development of skills, in particular through the possibilities provided by the Physics laboratory and have to do with the manipulation of experimental devices, the estimation of sizes and quantities through simple calculations resulting from measurements as well as theoretical calculation exercises.
After the end of the course, the student will have acquired theoretical and laboratory knowledge in General Physics and especially in Optics and Technology, as a basic background

for a number of other courses in his specialty, while he will have been helped to understand modern methods, technologies and in general applications established in the practice of graphic arts technology.

General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search, analysis and synthesis of data and information, using the necessary technologies
- Working individually
- Teamwork
- Work in an interdisciplinary environment
- Promoting free, creative and inductive thinking

(3) SYLLABUS

Theoretical part

i. Introduction (nature and characteristics of light)
ii. Geometric optics: light reflection on flat and curved surfaces, mirrors, mirror errors, refraction of light (limit angle, total reflection, refraction through medium with parallel surfaces, refraction through prism, Lenses (lens types, lens errors).
iii. Photometry (photometric quantities, point and extended sources, illuminated surfaces, light intensity, light measuring devices)
iv. Optical instruments (the eye, the magnifying glass, the microscope, the camera)
v. Light sources (Hot and cold light sources, Laser)
vi. Laser I: Principles of operation and properties of radiation
vii. Laser II: Applications in Graphic Arts (composition analysis and surface treatment, imaging systems, etc.)
viii. Spectroscopy (Principles of optical spectroscopy, methods and analysis of pigments)
ix. Physical optics: contribution of light, diffraction and polarization phenomena

Laboratory exercises:

i. Introduction to Physics Lab, Measurements, Measurement Errors, Graphs, Computer Experimental Data Processing
ii. Theoretical exercise
iii. Measurements of geometric quantities
iv. Light refraction: Find the refractive index
v. Find the refractive index and the angle of total reflection
vi. Determining the focal length of the lens Finding the color and spherical error of the lens
vii. Determination of the focal length of a lens system
viii. Spectroscopy I: Calibration and identification of gas from its spectrum.
ix. Diffraction of light: Determination of the diameter of twilight grains and holes
x. Polarization: a) confirmation of Mulus's law, b) finding the material refractive index through the

Brewster angle
xi. Laser: Principles of operation and properties of radiation
xii. Photometry: Measurement of the polar distribution of a lamp and confirmation of the inverse law of the square of the distance.
xiii. Optical spectroscopy: a) Study of the reflection spectrum of surfaces and b) measurement of color

(4) TEACHING AND LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In the classroom (Theory). In the Laser lab (exercises and the practice exercise)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Presentations and lectures using audiovisual media.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	**Theoretical part** • Use of the e-mail and the website of the Department for the communication and information of the students respectively • Provision of educational material from the internet (internet), through appropriately designed pages that contain reports, references, educational materials, software and general information. • Perform, present and demonstrate experiments with instruments in the classroom • Assignment of tasks. **Laboratory part** • Performing a series of independent experiments in the Physics laboratory, in groups of two or three students. • Writing a technical report per experiment and student, with a presentation of the theoretical part, the experimental process, measurements and data processing, as well as commenting on the results • Use of ICT in teaching and laboratory education

Activity	*Semester workload*
Course total	*125*

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	**Theory** • Written final exam • Introductory knowledge test • Scientific reports • Written Laboratory Assignment (optional) • Mid-term evaluations (optional tests) **Laboratory** Written reports, assignments, oral midterm exams and written tests

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Πανεπιστημιακή Φυσική, H. D. Young, Εκδόσεις Παπαζήση, Αθήνα 1994
2. Εφαρμοσμένη Οπτική, Δημήτριος Ζευγώλης, εκδόσεις Τζιόλα, Θεσσαλονίκη 2016
3. Γεωμετρική Οπτική, Σπυριδέλης Ι., Καμπάς Κ.
4. Γεωμετρική Οπτική, Γιώργος Ασημέλλης, Γιάννης Βαμβακάς, Πάνος Δρακόπουλος
5. Οπτική, Κ. Αλεξόπουλου και Μαρίνου, εκδόσεις Κοκοτσαλάκη, Αθήνα 1992
6. Πειράματα Οπτικής: Εργαστηριακές ασκήσεις Φυσικής, Ιωάννης Σιανούδης, εκδόσεις Λύχνος, Αθήνα 2005

Additionally, a series of additional educational materials, such as exercises, software, notes and individual excerpts from books, etc. provided through a network, through web pages designed exclusively for use by the students of the course (closed access collection).

7. Hecht E., Zajac A. (1998), Optics, Addison Wesley
8. M. Young (2000), Optics and Lasers, Including Fibers and Optical Waveguides, 5th ed., Springer, New York
9. Bergmann L., Schaefer C. (1987). Lehrbuch der Experimental Physik, Band 3, W. de Gruyter, Berlin
10. Demtroeder W. (1996). Laserspectroscopy, Springer Verlag, Berlin