The Ohio State University
Colleges of the Arts and Sciences New Course Request

Physics
Academic Unit
Physics
Book 3 Listing (e.g., Portuguese)
PHY 655 Grad Holography I
Number Title
Grad Holography I Graduate 5
18-Character Title Abbreviation Level Credit Hours

Summer Autumn Winter X Spring Year 2009
Proposed effective date, choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

A. Course Offerings Bulletin Information

Follow the instructions in the OAA curriculum manual. If this is a course with decimal subdivisions, then use one New Course Request form for the generic information that will apply to all subdivisions; and use separate forms for each new decimal subdivision, including on each form the information that is unique to that subdivision. If the course offered is less than a quarter or a term, please complete the Flexibly Scheduled/Off Campus/Workshop Request form.

Description (*not to exceed 25 words*): Introduction to the theory and basic technique of 3D image making. Students will construct a diode laser and use it to make holograms.

Quarter offered: W Distribution of class time/contact hours: 4 – 2hr classes
Quarter and contact/class time hours information should be omitted from Book 3 publication (yes or no): Yes

Prerequisite(s): none

Exclusion or limiting clause: none

Repeatable to a maximum of 15 credit hours.

Cross-listed with: H455

Grade Option (Please check): Letter ☒ S/U ☐ Progress ☐ What course is last in the series? _____

Honors Statement: Yes ☐ No ☒ GEC: Yes ☐ No ☒ Admission Condition
Off-Campus: Yes ☐ No ☒ EM: Yes ☐ No ☒ Course: Yes ☐ No ☒
Embedded Honors Statement: Yes ☐ No ☒
Service Learning Course*: Yes ☐ No ☒ *To learn more about this option, please visit http://artsandsciences.osu.edu/currofc/

Other General Course Information: For graduate students enrolled in the graduate interdisciplinary specialization "Analysis of Material Culture"
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")

B. General Information

Subject Code 500799 Subsidy Level (V, G, T, B, M, D, or P) D
If you have questions, please email Jed Dickhaut at dickhaut.1@osu.edu.

1. Provide the rationale for proposing this course:
This course will allow graduate students to take the H455 holography course for credit. This course is envisaged as part of the proposed new graduate interdisciplinary specialization "Analysis of Material Culture"

2. Please list Majors/Minors affected by the creation of this new course. Attach revisions of all affected programs. This course is (check one): ☐ Required on major(s)/minor(s) ☐ A choice on major(s)/minors(s)
☒ An elective within major(s)/minor(s) ☐ A general elective:
interdisciplinary specialization "Analysis of Material Culture"

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.

Additional seats will be added, as necessary to accommodate the graduate students who will take the course.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes ☐ No ☒ List:

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: No

6. Expected section size: 20 Proposed number of sections per year: 1

7. Do you want prerequisites enforced electronically (see OAA manual for what can be enforced)? Yes ☐ No ☒

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*):
Not Applicable ☒

9. **Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the OAA curriculum manual and e-mail to asccurrofc@osu.edu.**

Approval Process The signatures on the lines in ALL CAPS (e.g. ACADEMIC UNIT) are required.

1.	Academic Unit Undergraduate Studies Committee Chair	RICHARD E. Hughes	29-OCT-2007
		Printed Name	Date
2.	Academic Unit Graduate Studies Committee Chair	THOMAS J. HUMANIC	29-OCT-07
		Printed Name	Date
3.	**ACADEMIC UNIT CHAIR/DIRECTOR** (ACTING)	THOMAS J. HUMANIC	29-OCT-07
		Printed Name	**Date**

4. **After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 4132 Smith Lab, 174 West 18th Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to asccurrofc@osu.edu. The ASC Curriculum Office will forward the request to the appropriate committee.**

5.	**COLLEGE CURRICULUM COMMITTEE**	**Printed Name**	**Date**
6.	**ARTS AND SCIENCES EXECUTIVE DEAN**	**Printed Name**	**Date**
7.	Graduate School (if appropriate)	Printed Name	Date
8.	University Honors Center (if appropriate)	Printed Name	Date
9.	Office of International Education (if appropriate)	Printed Name	Date
10.	**ACADEMIC AFFAIRS**	**Printed Name**	**Date**

Phy 655 Course Description:

Exploration of laser holography as a tool in art and science. Students learn the basic techniques of 3D image making, create and display holograms, construct a diode laser and use it to make holograms.

Course Objectives:
This course will introduce and encourage exploration of holography as an artistic and scientific tool. The student will create and evolve three-dimensional holographic imagery using created and found objects to produce an artistic experience for the viewer.

Upon successful completion of the course, the student will:

- understand the basic science concepts and techniques of holography
- understand the basics of creating artistic imagery using holography as an art tool
- construct and use a basic diode laser
- understand some uses of science and art in society

Textbook:
The Holography Handbook by Unterseher, Hansen and Schlesinger
Practical Holography by Outwater and Hamersveld

Phy 655 Methods of Evaluation

Work in the course will be evaluated on the basis described below:

Evaluation:

Project 1: Diffraction Grating	10%
Project 2: One-step Rainbow Hologram	10%
Project 3: Split Beam Transmission Hologram	10%
Project 4: Single Beam Reflection Hologram	10%
Final Exhibition Piece	15%
Leading Class	15%
Exam	15%
Class Participation and Attendance	15%

Projects (40%): The four projects represent the four type of holograms the students make.

Final Exhibition Piece (15%): The final exhibition piece must be presented for display in the final class show.

Lead Class (15%): During the class you are required to lead a discussion of a scientific topic related to holography or waves. For this discussion you will work alone. You will be given roughly one and one-half hours for the discussion. In addition you are required to turn in an outline or summary of your topic.

Final Exam (15%): During the last week of class you will be given a final exam covering the material which was presented to you during the quarter in lectures and discussions. The exam will be closed book and will consist of roughly 40 multiple choice, matching and fill-in questions.

Participation and Attendance (15%): Student contribution to the class discussion during the quarter is important to making the class interesting and informative. Attendance at presentations by other students or discussion is required.

Phy 655 Topical Outline

The material discussed in the lectures is listed below.

Lecture	Topic(s) considered
I	Introduction - What is Holography?
II	Stereoscopic Vision. The Eye: How do we see?
III	Waves and Wave Properties. Light and Sound
IV	Propagation of Waves, Interference and Diffraction
V	Waves and Survival
VI	Holography Rules
VII	The Grating Equation, Diffraction Gratings
VIII	Wave-Particle Duality, Intro to Quantum Mechanics
IX	Bohr Theory, Quantization
X	Lasers, Construction of a Diode Laser
XI	One Step Rainbow Holograms
XII	The Optics of Mirrors
XIII	Index of Refraction, Lenses, Shock waves
XIV	Space Dimensions and $1/r^2$
XV	Are Human Beings Special?
XVI	Transmission Holograms
XVII	Depth of Field
XVIII	Reflection Holograms
XIX	Problems