# **NEW OR REVISED COURSE PROPOSAL**

CENTRAL NEW MEXICO COMMUNITY COLLEGE

### MSE CURRICULUM COMMITTEE

**This is course is NEW / EXISTING**

|  |  |
| --- | --- |
| **Prefix, Number, and Course Title** | **ENGT 1020 Optics** |
| **Discipline** | **Engineering Technology** |
| **Credit Hours and Type** | **3 credits (5 contact hours; 2 hours lectures, 3 hours lab)** |
| **Proposal Originator** | **Anna Gilletly** |
| **Curriculum Liaison** | **Michael Faulhaber** |

## Proposal

**I. Description of New Course or Existing Course Change** (Include any additions, deletions, or modifications; address the impact on other schools’ offerings)

Request new HED course number.

**ENGT 1020 - Optics**

**Course Description**: An introductory course dealing with terminology and techniques in the use of analytical and laboratory methods for planning, executing and evaluating arrangements using components such as mirrors, prisms, thin and thick lenses, diffusers, stops, and various types of light sources. Reflection, refraction, dispersion, image formation and aberrations are studied with emphasis on the ray concept of light.

Pre-requisite: Math 1220 – College Algebra

Student Learning Outcomes

1. Describe the properties of the electromagnetic spectrum
2. Describe the function of the various optical components: prisms, gratings, positive/negative lens, convex/concave mirrors.
3. Analyze optical systems for basic characteristics: focal length, numerical aperture, magnification, image location using the ray method of optics
4. Analyze the use of spectrometers, interferometers, diffraction gratings using wave optics.
5. **Justification for the Addition/Change.** (Explain the reason for the addition/change; address the impact on current students.)

Next phase of certificate expansion for the Engineering Tech program. This course will pre-align with CNM Ingenuity Quantum Technician program for CPL (credit for prior learning).

**IIa. For new courses:** List course prerequisites, or corequisites, or pre- or corequisites

Pre-requisite: Math 1220 – College Algebra

**Is this new course going to be offered every term? YES / NO**

**If this is a general education course, indicate which core area applies to the course:**

**n/a**

**If this is an Arts & Sciences course, indicate which core area applies to the course:**

**n/a**

**If this is a CTE course, indicate which core area applies to the course:**

**Engineering**

**Is this course repeatable for credit? If yes, indicate maximum credits and/or number of times course can be repeated. YES / NO**

**Will the course be delivered in person? YES / NO**

**Will the course be delivered online? YES / NO**

**Is this course currently part of the NM Common Course Numbering? YES / NO**

**Was this course developed specifically for transfer to a program(s) at a NM 4-year higher education public institution? YES / NO**

**If yes, list the institution(s), program(s), and suggested equivalent course(s):**

1. **Impact of the Change**

Consider the effects and consequences that the change might have on various stakeholders.

(a) YES or NO Will this change affect existing articulation agreements?

(**Please perform a search for all programs using the course**)

(b) YES or NO Will the change affect existing accreditations?

(c) YES or NO Will the change increase the need for additional facilities and/or equipment?

(d) YES or NO Will the change increase the need for additional faculty?

(e) YES or NO Will the change affect pre- or co-requisite considerations?

**(Please perform a search for all programs using the course)**

(f) YES or NO Will the change affect graduation requirements?

(g) YES or NO Will the change negatively affect continuing students?

(h) YES or NO Will the change increase the need for additional course offerings (sections)?

If you answer **Yes** to any item (*a through h*)*,* please use the space below to describe the effects and the actions you have taken to address them. Attach any additional paperwork and label the effects you are addressing with the letter indicating the impact you are addressing.

**IV. Course Attributes**

**Banner Attributes – highlight all that apply**

Arts & Sciences

Arts & Sciences Lab Science

Arts & Sciences Foreign Language

Arts & Sciences Literature

Capstone

Does not apply

**Does this course have work embedded learning attributes? If yes, indicate which.**

**V. Financial Aid Questions**

**Does this course fulfil a degree or certificate requirement? YES / NO**

**If yes, what degree or certificate?**

**Engineering Tech Certificate of Completion**

**Does this course have lab credit hours? YES / NO**

**Has this course been offered previously under a different name? YES / NO**

**If yes, what was the previous name of the course?**

**VI. Student Learning Outcomes**

**Please list the learning outcomes for this course.**

1. Describe the properties of the electromagnetic spectrum
2. Describe the function of the various optical components: prisms, gratings, positive/negative lens, convex/concave mirrors.
3. Analyze optical systems for basic characteristics: focal length, numerical aperture, magnification, image location using the ray method of optics
4. Analyze the use of spectrometers, interferometers, diffraction gratings using wave optics.

**Please submit a copy of the syllabus for this course along with this proposal.**

Draft - 15wk – Syllabus – ENGT 1020 - Optics

Pre-requisite: MATH 1220 – College Algebra

# General Information

| General Information | Items |
| --- | --- |
| Instructor Name: |  |
| Email: |  |
| Office Location: |  |
| Office Phone: |  |
| Office Hours: |  |
| Course Number: |  |
| Section Number: |  |
| Semester & Year: |  |
| Credit Hours: |  |
| Campus/Rooms: |  |
| Meeting Time: |  |

## Course Description

An introductory course dealing with terminology and techniques in the use of analytical and laboratory methods for planning, executing and evaluating arrangements using components such as mirrors, prisms, thin and thick lenses, diffusers, stops, and various types of light sources. Reflection, refraction, dispersion, image formation and aberrations are studied with emphasis on the ray concept of light.

## Required Materials

**No Required Textbook, all readings will be provided by instructor.**

## Course Student Learning Outcomes

1. Describe the properties of the electromagnetic spectrum
2. Describe the function of the various optical components: prisms, gratings, positive/negative lens, convex/concave mirrors.
3. Analyze optical systems for basic characteristics: focal length, numerical aperture, magnification, image location using the ray method of optics
4. Analyze the use of spectrometers, interferometers, diffraction gratings using wave optics.

## Assessments

## Schedule of Topics (tentative)

|  |  |  |
| --- | --- | --- |
| **Schedule** | **Instructional Unit (IU)** | **Science Practical Activities (SPA)** |
| Week 1 | Introduction to Optics | Lab Safety and Handling of Optical Components |
| Weeks 1-2 | Reflection and Refraction: Prisms, Waveguides, and Dispersion | RSpec Explorer Spectrometer\*\* |
| Weeks 3-4 | Focusing, Imaging, and the Paraxial Approximation | ThorLabs Microscopy Education Kit\* – Optical Imaging 1 Experiments |
| Week 5-6 | Thin Lens | Lab: Thin Lens |
| Week 6-7 | Think Lens and Compound Lens | Lab: Compound Lens |
| Week 8 | Apertures, Stops, Pupils, Windows | Lab: Aperatures |
| Week 9-10 | Mirrors: Convex, Concave | Lab: Geometric Optics and Mirros |
| Week 11 | Cameras: Focusing, Resolution, and Contrast | ThorLabs Microscopy Education Kit\* – Optical Imaging 2 Experiments |
| Week 12 | Aberrations | ThorLabs Microscopy Education Kit\* – Aberrations and Illuminations |
| Week 12 | Microscopy / Telescopes | Lab: build a microscope and telescope |
| Week 13 | Darkfield Imaging | ThorLabs Microscopy Education Kit\* – Conjugate Planes and Darkfield Imaging |
| Week 14 | Spectra and Filters | ThorLabs Microscopy Education Kit\* – Spectra and Filters |
| Week 15 | Conclusion | Lab: Practical System Design |

\* ThorLabs Microscopy Education Kit

**A machine with a number of objects on it

AI-generated content may be incorrect.**

\*\* RSpec Explorer

