

# Degree Schedule – Graduate Certificate in Frontiers in Optics and Photonics

Due one semester prior to completing certificate requirements. Complete form, obtain signatures, and then upload to [Canvas](https://mtu.instructure.com/courses/286200/modules) (preferred) or email to gradschool@mtu.edu. Your [Degree Completion Timeline](https://mymichigantech.mtu.edu/web/home-community/current-students?p_p_id=GradDegreeStatus_WAR_EAS_Grad_Degree_Statusportlet&p_p_state=maximized&launch=Y) lists all items needed for your degree.

The graduate certificate in “Frontiers in Optics and Photonics” aims at developing the foundation of Integrated photonics, Nano optics, Computational electromagnetics, Quantum optics, Optical wave propagation in complex media. Based on these skills, students can explore applications in telecommunications, biophotonics, quantum computing, sensing and imaging. Students earning this certificate will be able to solve open-ended problems in one or more of the following topics: integrated photonics, plasmonics, electromagnetism, Fourier optics, microwave engineering, antenna engineering. Students earning this certificate will be able to design some of the basic elements of integrated optical devices such as waveguides, resonators, modulators, and beam splitters. This is a nine-credit certificate.

## Contact person

Please complete the table below to identify the person to be contacted for questions about this curriculum.

|  |  |
| --- | --- |
| Description | Program Information |
| Name: | Yoke Khin Yap |
| Phone number: | 906-487-2900 |
| Email: | ykyap@mtu.edu |

## Changes for the upcoming catalog year

Please select the option that best reflects this curriculum.

|  |  |
| --- | --- |
| Description | Select one |
| There are no changes to this curriculum for the upcoming catalog year. | X |
| There are curriculum changes for the upcoming catalog year. (Please indicate those changes using tracked changes to indicate additions, changes, and deletions) |  |

## Student Information

Complete the information requested below.

Name Last or Family Name, First Name or FNU

M-Number (M12345678) M

Your name will be printed on your certificate as it appears in our University records with either your legal or preferred name. Please choose how you would like your name to appear on your certificate and type it in full. Students may contact the Registrar’s Office to change their preferred name; employees may contact Human Resources.

Selection for name Choose an item.

Typed name Name as it should appear on diploma

## Accelerated Certificates

Certificate programs may allow up to three (3) credits earned while an undergraduate at Michigan Tech to be used to fulfill the requirements of their bachelor’s degree and graduate certificate. To earn an accelerated certificate, students must:

* [apply for admission](https://www.mtu.edu/gradschool/prospective/apply-now/) to the certificate program following current procedures,
* follow all current policies regarding the reuse of credits, and
* mark the accelerated class(es) with “AC” in the “Semester and Year Taken” column in the tables below.

## Required Coursework (3 Credits)

In the table below, mark the classes taken for the certificate with the semester the credits were earned.

| Semester and Year Taken | Course Number | Course Title | Number of Credits |
| --- | --- | --- | --- |
| Semester | PH4292 / MSE 4292 | Photonic Materials | 3 |

## Elective Coursework (6 Credits)

In the table below, mark the classes taken for the certificate with the semester the credits were earned.

| Semester and Year Taken | Course Number | Course Title | Number of Credits |
| --- | --- | --- | --- |
| Semester | PH 5210 | Electrodynamics I | 3 |
| Semester | PH 5151 / MSE 5151 | Quantum Field Theory for Photonics and Materials | 3 |
| Semester | PH 5410 | Quantum Mechanics I | 3 |
| Semester | EE 5520 | Fourier Optics | 3 |
| Semester | EE 5410 | Engineering Electromagnetics | 3 |
| Semester | EE 5526 | Microwave Engineering | 3 |
| Semester | EE 5528 | Antenna Engineering | 3 |

## Coursework Substitutions

Fully complete the table with the information requested. Include any courses for the certificate that are not named in the above tables. Approval of courses not listed above is at the discretion of the program granting the certificate.

| Semester and Year Taken | Course Numberex: CH5555 | Course TitleInclude the course number (as listed above) of the substitution and a brief rationale.The table will expand to fit your text. | Number of Credits |
| --- | --- | --- | --- |
| Semester | Course Number | Course number of substitution, and rationale | Credits |
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Graduate School Use Only: Total Credits

## Approval Signatures

Obtain signatures from the certificate program, then upload signed form to [Canvas](https://mtu.instructure.com/courses/286200/modules) (preferred) or email to gradschool@mtu.edu. The Graduate School approves the form after receipt and verification.

Department chair, Physics OR [Graduate Program Director](https://www.mtu.edu/gradschool/prospective/directors/), Frontiers in Optics and Photonics Date

Graduate School Approval Date