Post-Baccalaureate Certificate in Photonic Devices and Systems

About This Program

Students completing the Post-Baccalaureate Certificate in Photonic Devices and Systems will gain both fundamental and practical understanding of the photonics technology, including the optical systems, lasers, photonic devices and sub-systems, and methods widely employed in the industry. They will be prepared to take part in developing and operating various photonic devices, sub-systems, and systems for optical communications / information technology, chemical and biomedical sensing, solar-energy conversion, as well as space and defense applications. The knowledge and skills acquired by the students will facilitate the next steps in their careers and enhance their employment potential in industrial and government sector.

Students who successfully complete the non-degree certificate program will be eligible to apply for admission to the MS in Electrical Engineering and count course credit from the certificate toward completion of non-degree certificate

Competencies

1. Upon completion, students will be able to describe propagation of light in free space, at dielectric interfaces, in birefringent and semiconducting materials, and in waveguides.
2. Upon completion, students will be able to design and analyze simple imaging systems consisting of lenses and mirrors.
3. Upon completion, students will be able to understand principles of operation and design trade-offs of key photonic devices and instruments: lasers, optical amplifiers, modulators, filters, couplers, polarizers, waveplates, interferometers, spectrometers, detectors, solar cells, optical sensors, etc.
4. Upon completion, students will be able to list important applications of second- and third-order nonlinear effects in classical and quantum optics.
5. Upon completion, students will be able to describe principles and key features of second harmonic generation, optical parametric amplification, self- and cross-phase modulation, four-wave mixing, and Raman amplification.
6. Upon completion, students will be able to identify the main components of modern WDM communication systems, make simple estimates of system’s performance under various conditions, and design a system with appropriate parameters for given application.
7. Upon completion, students will be able to understand modern biological and chemical sensing techniques and their applications.
8. Upon completion, students will be able to list basic principles, applications, and latest advances in the area of nanophotonics.
9. Upon completion, students will be able to understand main techniques used in nano- and micro-fabrication.
10. Upon completion, students will be able to perform basic fabrication and processing steps for simple electronic / photonic devices.

Admissions Criteria

Unconditional Admission is granted if all of the following conditions are met:

STAND-ALONE CERTIFICATE

- A Bachelor’s or Master’s degree in a STEM discipline is required.
- Those who desire to complete the certificate program without enrolling in graduate degree program must be admitted to UTA as a non#degree seeking student.
- A personal statement detailing the applicant’s background and skills pertaining to photonics, his/her interest in specific topics, and his/her expected benefit from completing this program.

CONCURRENT CERTIFICATE

The unconditional admission criteria are the same as those to the MSEE program, which are currently as follows:

- A Bachelor’s degree in an engineering discipline with a minimum GPA of 3.25 (junior and senior level or equivalent) or a current enrollment in an engineering Master’s program at UTA with a minimum GPA of 3.0.
- GRE Quantitative and Verbal sections scores should meet the EE admission requirement for new applicants.
- If English is not the applicant's native language, he/she should meet the EE admission requirement on TOEFL iBT, or IELTS. International applicants who have successfully completed a BS or MS from an institution in the United States and are not seeking funding as a Graduate Teaching Assistant, are not required to meet this requirement.
- Performance on the GRE will not be the sole criterion for admitting applicants or denying admission to the master's program. In cases where GRE performance does not meet the minimum requirements, all other qualifications presented by the applicant will be carefully evaluated for evidence of potential for success.

Curriculum

Foundations		
EE 5380	PRINCIPLES OF PHOTONICS AND OPTICAL ENGINEERING	3
EE 5384	OPTOELECTRONIC DEVICES FOR COMMUNICATION	3
Electives		
Select two courses from the following:		6
EE 5343	SILICON INTEGRATED CIRCUIT FABRICATION TECHNOLOGY	
EE 5385	NONLINEAR OPTICS	
EE 5388	LASERS	
EE 5389	TOPICS IN OPTICS (Nanophotonic Device Engineering)	
EE 5389	TOPICS IN OPTICS (Silicon Photonics)	
EE 6365	ADVANCED FIBER OPTICS SYSTEMS	
EE 6381	NANOPHOTONICS	
EE 6382	OPTICAL BIOSENSORS: INSTRUMENTATION AND TECHNIQUES	
Total Hours		**12**

Program Completion

The certificate consists of 12 hours of graduate work with at least a 3.0 GPA at UTA. The time limit for completion of the Certificate Program is six years.

Advising Resources

EE Advising - General information

ELECTRICAL ENGINEERING

Location:

Master's - NH 531

Ph.D. - NH 545

Email:

ee_grad_advising@uta.edu

Phone:

Master's - 817-272-3423

Ph.D. - 817-272-3472

Web:

Master's - Schedule graduate advising (https://outlook.office365.com/owa/calendar/EEGradAdv@bookings.uta.edu/bookings/s/W_X-t8ySDEaqCfz09loAMg2/)

Ph.D. - Schedule graduate advising (https://outlook.office365.com/owa/calendar/EEGradAdv@bookings.uta.edu/bookings/s/ja39PnPrvEC3KPK1JroI9A2/)