Electrical Engineering

The Master of Science in Electrical Engineering may be earned with thesis option or non-thesis option. Either option may be used as preparation for further graduate study or employment in industrial research, development, or design.

Also a strong Ph.D. program is available for those who wish to pursue a research and/or teaching career in Industry, Government or Academia.

Admissions Requirements

Admission to the M.S. program requires a B.S. in electrical engineering, computer engineering or computer science, and an overall undergraduate GPA of at least 3.0. For non-native English speakers, the minimum acceptable TOEFL score for admission to the M.S. program is 90 (minimum 18 in each area, with minimum of 19 on Speaking). The GRE is required for all programs of study but may be waived upon request for graduates from US Universities (see below). Admission is further limited by available room in the elected program of study. Meeting the above minimum requirements alone does not guarantee admission.

Applicants to the Master's and PhD programs who do not have a Bachelor's degree in Electrical Engineering or Computer Engineering, but have a closely related degree from an accredited college or university, must have taken the following pre-requisite courses: Courses equivalent to ECE 109, ECE 209, ECE 212, ECE 220, ECE 301, ECE 302 and ECE 303.

GRE scores within the last four years of the date of anticipated admission. Guideline for minimal GRE percentile scores are 70 percentile verbal, 90 percentile quantitative, and 50 percentile analytical or writing. GRE scores for students who are graduates from NC State may be waived. They also might be waived for graduates from US ABET accredited programs with good GPAs.

All international applicants from non English speaking countries must submit TOEFL scores. The TOEFL must have been taken within two years of the date of anticipated admission. On the TOEFL iBT, students must have a minimum of 18 on each section of the test with a minimum total of 90. Scores on previous versions of the TOEFL are considered with the same qualitative standard. On the IELTS, we require a minimum score of 6.5 in each section. This requirement also applies to US citizens whose principal language of instruction has not been English (for example, most applicants from Puerto Rico and the Virgin Islands).

TOEFL - institution code 5496; department code 66
GRE - institution code 5496; department code 1203

Admission to the Ph.D. program requires a B.S. or M.S. in electrical engineering, computer engineering or computer science with an expectation of an overall GPA of at least 3.25. The minimum acceptable TOEFL score for admission to the Ph.D. program is 90 (minimum 18 in each area, with minimum of 19 on Speaking). The GRE is required for all programs of study but might be waived for NC State graduates or graduates from other US ABET accredited schools with good GPAs. Admission is further limited by available room in the elected program of study, and meeting the minimum requirements as given above does not guarantee admission.

Master's Degree Requirements

Thirty-one (31) credit hours; a thesis is optional. Students must have at least 21 hours of ECE courses that cover at least three specialty areas and have at least three credit hours of advanced-level (700-level) ECE courses. Students electing the Option B non-thesis option must meet core course requirements; have ECE courses that cover at least three specialty areas' and have at least three credit hours of 700-level ECE courses.

The Master's degree is offered online through Engineering OnLine. Applications to these MS on-line programs are through the ECE Department and all students must comply with ECE program requirements.

Doctoral Degree Requirements

Approximately 54 credit hours are required beyond the M.S. degree or 72 credit hours beyond the B.S. degree. For those with an NC State MS degree in our department, no additional courses are required. For those with an NC State MS degree in another department, 6 credit hours are required in our department. For those with a non NC State MS degree, 12 credit hours of coursework are required. For those with only a Bachelors degree 30 credit hours of coursework are required. The remaining credit hours are research.

The department wishes to evaluate a Ph.D. student's research potential as quickly as possible. Consequently, all Ph.D. students are required to pass a qualifying review before the end of their third semester of study. This review is based on the student's academic performance to date and the results of a project with one of their committee members. Results are presented to the committee in both written and oral form. Based on this review, the committee will decide if the student may continue in the Ph.D. program.

Student Financial Support

The department offers financial support to qualified students in the form of teaching assistantships, research assistantships, and fellowships. These sources of support generally include coverage of tuition and fees.

Degrees

- Electrical Engineering (MS) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/electrical-engineering-ms/)
- Electrical Engineering (MS): Internship Concentration (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/electrical-engineering-ms-internship-concentration/)
- Electrical Engineering (PhD) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/electrical-engineering-phd/)
- Electrical Engineering (Minor) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/electrical-engineering-minor/)
- 5G Technologies (Certificate) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/5g-technologies-certificate/)
- ASIC Design & Verification (Certificate) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/asic-design-and-verification-certificate/)
- Electrical Engineering (Certificate) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/electrical-engineering-certificate/)
- Nano-Systems Engineering (Certificate) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/nano-systems-engineering-certificate/)
• Renewable Electric Energy Systems (Certificate) (http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/renewable-electric-energy-systems-certificate/)

Faculty

Full Professors

David E Aspnes
B. Jayant Baliga
Mesut E. Baran
Salah M. A. Bedair
Subhashish Bhattacharya
Donald L. Bitzer
Alper Yusuf Bozkurt
Gregory T Byrd
Rada Yuryevna Chirkova
Mo-Yuen Chow
Huaiyu Dai
William Rhett Davis
Alexandra Duel-Hallen
Michael James Escuti
Do Young Eun
Brian Allan Floyd
Paul D. Franzon
Edward F. Gehringer
John J. Grainger
Edward Grant
Robert Wendell Heath
Brian L Hughes
Iqbal Husain
Ki Wook Kim
Frederick Anthony Kish Jr.
Robert Michael Kolbas
Hamid Krim
Ning Lu
Srdjan Miodrag Lukic
Leda Lunardi
Thomas Kenan Miller III

Veena Misra
Rainer Frank Mueller
John F. Muth
H. Troy Nagle Jr.
Jagdish Narayan
Arne Nilsson
Omer Oralkan
Mehmet Cevdet Ozturk
Harilaos George Perros
Douglas Stephen Reeves
Eric Rotenberg
Georgios Rouskas
Xipeng Shen
Mihail Lorin Sichitiu
Zlatko Sitar
Matthias F. M. Stallmann
Daniel D. Stancil
Michael B. Steer
J. K. Townsend
James Tuck
Daryoosh Vashaee
John Victor Veliadis
Ioannis Viniotis
Mladen Alan Vouk
Wenyu Wang
Jonathan Wierer
Fen Wu
Huiyang Zhou

Associate Professors

Jacob James Adams
Dror Zeev Baron
Michela Becchi
Aranya Chakraborty
Alexander G. Dean
Ismail Guvenc
Khaled Abdel Hamid Harfoush
Michael W. Kudenov
David S. Lalush
Edgar Lobaton
Zeljko Pantic
Nuria Gonzalez Prelcic
David Ricketts
Nitin Sharma
Cranos M. Williams

**Assistant Professors**

Aydin Aysu
Amay Jairaj Bandodkar
Michael Daniele
Caterina M. Gallippi
Yaoyao Jia
Shih-Chun Lin
Spyridon Pavlidis
Bradley Galloway Reaves
Muhammad Shahzad
Wenyuan Tang
Chau-Wai Wong
Tianfu Wu

**Practice/Research/Teaching Professors**

Jordan Besnoff
Gregory Edward Bottomley
Laura J Bottomley
James Paul Dieffenderfer
Robert Joseph Evans
Rachana Ashok Gupta
Seth E. Hollar
Douglas C. Hopkins
Andrew J. Rindos III
Steven D. Jackson
Robert Dwight Oden Jr.

Bongmook Lee
David Lee Lubkeman
Hatice Orun Ozturk
Tania Milkova Paskova
Elena Nicolescu Veety
Leonard Wilson White
Donna G Yu
Wensong Yu

**Professors Emeritus**

George F. Bland
John R. Hauser
Wilbur Carroll Peterson
Winser E. Alexander PhD
Tildon H Glisson Jr
Michael A. Littlejohn
Carlton M. Osburn
Sarah Ann Rajala
Wesley E. Snyder

**Adjunct Faculty**

Mihail Devetsikiotis
Yan Solihin