

# 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.

## 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.

## More Information

Electrical Engineering Program Website (<https://www.ece.ncsu.edu/grad/>)

## 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). 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.

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

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). 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.

## Applicant Information

### Electrical Engineering (MS)

- **Delivery Method:** On-Campus, Online, Hybrid
- **Entrance Exam:** None
- **Interview Required:** None

### Electrical Engineering (PhD)

- **Delivery Method:** On-Campus
- **Entrance Exam:** None
- **Interview Required:** None

## Application Deadlines

- **Fall:** January 9 (US and Intl)
- **Spring:** July 1 (US and Intl)

## Degrees

- 5G Technology (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/>)
- Electrical Engineering (Minor) (<http://catalog.ncsu.edu/graduate/engineering/electrical-engineering/electrical-engineering-minor/>)
- 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/>)
- 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

Sabre Kais

Derek Kamper

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

Wenye Wang

Jonathan Wierer

Fen Wu

Huiyang Zhou

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## Associate Professors

Jacob James Adams  
 Dror Zeev Baron  
 Michela Becchi  
 Aranya Chakraborty  
 Stanley Cheung  
 Hantao Cui  
 Alexander G. Dean  
 Paschalis Gkoupidenis  
 Zhishan Guo  
 Ali Gurbuz  
 Sevgi Gurbuz  
 Ismail Guvenc  
 Khaled Abdel Hamid Harfoush  
 Michael W. Kudenov  
 David S. Lalush  
 Edgar Lobaton  
 Zeljko Pantic  
 Nuria Gonzalez Prelcic  
 Anderson Rodrigo de Queiroz  
 David Ricketts  
 Nitin Sharma  
 Cranos M. Williams

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## Assistant Professors

Aydin Aysu  
 Amay Jairaj Bandodkar  
 Michael Daniele  
 Demitry Farfurnik  
 Caterina M. Gallippi  
 Yaoyao Jia  
 Shih-Chun Lin  
 Yuan Liu  
 Spyridon Pavlidis  
 Bradley Galloway Reaves

Vijay Shah  
 Muhammad Shahzad  
 Wenyuan Tang  
 Chau-Wai Wong  
 Tianfu Wu  
 Chenhan Xu  
 Man Ki Yoon  
 Kaixiong Zhou

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## Practice/Research/Teaching Professors

Jordan Besnoff  
 Gregory Edward Bottomley  
 Laura J Bottomley  
 James Paul Dieffenderfer  
 Robert Joseph Evans  
 John Gajda  
 Rachana Ashok Gupta  
 Seth E. Hollar  
 Douglas C. Hopkins  
 Fu-Chen Hsaio  
 Andrew J. Rindos III  
 Steven D. Jackson  
 Robert Dwight Oden Jr.  
 Bongmook Lee  
 David Lee Lubkeman  
 Hatice Orun Ozturk  
 Tania Milkova Paskova  
 James Lee Reynolds  
 Elena Nicolescu Veety  
 Leonard Wilson White  
 Donna G Yu  
 Wensong Yu

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## Professors Emeritus

George F. Bland

John R. Hauser

Wilbur Carroll Peterson

Winsor E. Alexander PhD

Tildon H Glisson Jr

Michael A. Littlejohn

Carlton M. Osburn

Sarah Ann Rajala

Wesley E. Snyder

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## **Adjunct Faculty**

Mihail Devetsikiotis

Yan Solihin

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## **Teaching Associate Professors**

Mihail Cutitaru

Frederick J. Livingston