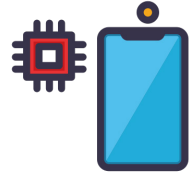
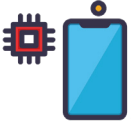




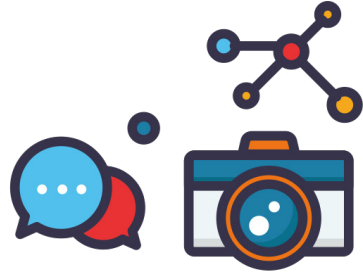
RICE ENGINEERING  
Electrical and  
Computer Engineering



**IEEE**

# HANDBOOK

Produced by the  
Rice IEEE Student Chapter  
2020-2021



## What is Electrical and Computer Engineering (ECE)?



Electrical and computer engineering (ECE) is the creation, innovation and design of technologies in computing, communications, electronics or automation. ECE is at the crossroads of hardware and software – the integration of these tools to create better, faster, safer technologies for things like cars, aircraft, computers, smartphones, or health devices.



Electrical and computer engineers are a diverse, smart, creative group of problem-solvers who innovate, create, and design technology that improves the world. Smartphones, GPS, cars, and even things like healthcare and national security would not exist as they do today without electrical and computer engineers. ELECs are at the heart of the intersection of innovation and technology. They invent technologies to change the world.



ELECs go on to work in almost every industry imaginable, including: healthcare, energy, national security, consumer electronics, space, and more.



## Everything You Need to Know About Rice ECE

If you are reading this, chances are you are planning on, or at least thinking about, majoring in ECE- Great choice! ECE is a demanding major, but is incredibly rewarding for those who are willing to put in the effort.

There are great opportunities available to Rice ELECs, and this handy guide is here to help plan your path towards an electrical engineering degree. Everyone is different, and as such, you may have needs or wishes that are not covered in the sample schedules included in this guide. Maybe you really want to double major in another subject or maybe you've always wanted to spend a semester abroad. These additional considerations will have an impact on your schedule. Remember, when attempting to estimate that impact, it is best to start planning early.

In trying to figure out how you want to develop your schedule, never underestimate how great a resource other people can be. When talking with your Divisional or Major Advisors, air your concerns. Suggest different options and request their feedback. In addition to your advisors, the other ECE professors can also serve as mentors and are just as interested in helping you have a fulfilling experience here at Rice. They generally do their best to be available to students (even those who haven't taken any classes from them

yet!). Form good relationships with your professors - you won't regret it later (especially when you need that letter of recommendation for grad school). Don't just stop with your professors. No matter your interest, chances are one of your peers has done it, considered doing it, or can put you in touch with someone who has. The upper - level students will be more than happy to talk with you about choosing courses as well.

## About Rice IEEE

The Rice Chapter of IEEE is a student club dedicated to connecting ELECs with academic and social opportunities in the ECE Department at Rice, the larger IEEE organization, and industry. Any undergraduate or graduate student is welcome to participate in our activities. One of our main goals is to prepare undergraduate ELEC majors for life "beyond the hedges". Rice IEEE encourages first and second - year students to major in Electrical Engineering and works to foster a strong community of students in ECE. Joining this nationally recognized club only requires an enthusiasm for electrical engineering!

## What We Do

- We expose students in ECE to important technical and career development topics in the field of electrical engineering by hosting weekly lunches with presentations given by professors, graduate students, and industry professionals.
- We provide academic advice to students by hosting presentations and Q&A sessions at advising luncheons as well as facilitating conversation between students and the ECE Department by hosting Town Hall meetings with faculty members where students can give their feedback to the Department.
- We support students by planning study breaks and social events throughout the year such as ice cream socials after ELEC 241 exams.



## About the IEEE

The Institute of Electrical and Electronics Engineers (IEEE) is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE (pronounced "Eye-triple-E") and its members inspire a global community through IEEE's highly-cited publications, conferences, technology standards, and professional and educational activities. Membership into the nationally recognized organization requires a \$32 annual membership fee but there is no fee necessary to join the Rice IEEE group.

## Who the IEEE serves

- With its global membership, the IEEE is a leading authority on areas ranging from aerospace systems, computers, and telecommunications to biomedical engineering, electric power, and consumer electronics.
- Members rely on the IEEE as a source of technical and professional information and services.
- To foster an interest in the engineering profession, the IEEE also serves student members in colleges and universities around the world.

## The IEEE has\*

- Over 3,400 student branches at colleges and universities in over 100 countries
- An IEEE Student Paper Competition for Region 5 (includes Texas)
- Publishes ~200 transactions, journals and magazines, including IEEE Spectrum Magazine ([spectrum.ieee.org](http://spectrum.ieee.org));

\*Information obtained from <http://www.ieee.org> (data current as of July 2020)

## Academic FAQs

### Balancing Your Schedule

It is usually best to take no more than 10 to 12 hours of ELEC/Math/Science courses a semester. Leave the rest for distribution, and be sure to add in some fun classes and an LPAP. First - year seminars are often a good choice because of their small class size and discussion-oriented nature. College is a unique time in which you can learn about nearly anything you want. Take advantage of that opportunity while you're here.

## Linear Algebra (Math 355 vs CAAM 335)

Linear algebra is very important, particularly if you want to pursue data science but a strong foundation in linear algebra is crucial for all ELECs. While MATH 355 (Linear Algebra) focuses strictly on theory, CAAM 335 (Matrix Analysis) integrates applications from several disciplines. CAAM 335 focuses more on using MATLAB programming for applications. Many choose whichever class fits into their schedule better. It is best to take Linear Algebra either with or after MATH 212, but at the latest in spring of your second year. Linear Algebra is a prerequisite for ELEC 301.

## Extra Math/Science Class

Many ELECs choose to take MATH 211 as their extra math/science class because differential equations play an important role in many areas of electrical engineering. Typically approved courses include: BIOS 201, CAAM 378, CHEM 122/124, MATH 211, and MATH 222. You should always check with your advisor along with the list in Degree Works to see if your AP credit will fulfill your math/science elective.

## When to take Comp 140

COMP 140 is a general requirement and a prerequisite for many upper - level computer science courses or data science specialization courses. Taking COMP 140 early can offer you a greater flexibility in your scheduling if you are able to take it in the fall of your first year.

## When to Take ELEC 220

Most ELECs will advise you to take ELEC 220 first year if possible. It offers a brief look into the computer engineering side of ELEC and gives you a head start if you decide to pursue that specialization.

## Taking COMP 215

Taking COMP 215 during fall of second year is strongly recommended for those considering the computer engineering specialization. COMP 215 is a prerequisite for many upper - level COMP electives so delaying it could hold up taking your desired electives in future years. The Java experience that COMP 215 offers is invaluable when applying to summer internships in the industry. Since most electrical engineers work with both hardware and software, having the background of COMP 215 opens doors and opportunities in software development.

## When to Take ELEC 326

Unless scheduling issues arise, everyone takes ELEC 326 the fall of either their second or third year. ELEC 241 and ELEC 326 are both classes with heavy coursework. If you do not think you are interested in pursuing computer engineering, perhaps it will not make much of a difference if you postpone ELEC 326 to the third fall semester. However, if you are very interested in computer engineering, taking ELEC 326 during second year offers a wider range of classes during third year that have ELEC 326 as a requirement. Ultimately, it is a personal decision and you can't really go wrong either way!

## Design Lab

Most students take their design lab in the spring of their third year. However, some take it in the spring of their second year instead. If you do, you can take the prerequisites (ELEC 242 or 262) concurrently. The design lab is a lot of fun, develops great skills for side projects and internships, and is what most people envision when they think of electrical engineering: programming microcontrollers, soldering circuit components, building circuit boards, etc. Taking the design lab in your second year opens up your schedule to allow you to study abroad or pursue an internship.

## The Big One: Taking ELEC 241 as a First - Year Student

This is the big question for those coming in with the big three APs, and as usual, there is no easy answer. ELEC 241 is generally seen as the “weed-out” course for ELECs (although the instructor insists it's not), and will consume a large portion of your time whenever you decide to take it. For this reason and also because of its prerequisites, most choose to take the class in the second year. It is also possible to take ELEC 241 first year if you come in with credit for MATH 101 and 102.

Pros: You will be a step ahead and have much more leeway in your schedule your next three years. We often hear of some first - year students doing just as well as the second - year students for different reasons. ELEC 241 will also give you a good idea if the major is right for you if you are not sure immediately.

Cons: ELEC 241 is a very intensive course, and combined with the stress of other classes and your first semester of college, you may feel overwhelmed. Taking ELEC 241 second year gives you more time to pick up proper study habits and adjust to the rigor of Rice classes. Some students may feel like they missed out on the fun of first year by jumping into this class right away.

Ultimately, this is a personal decision. If you are able to use AP credit for Math and think you want to be an ELEC, taking ELEC 241 as a first - year can be a big advantage.

## Graduate Courses

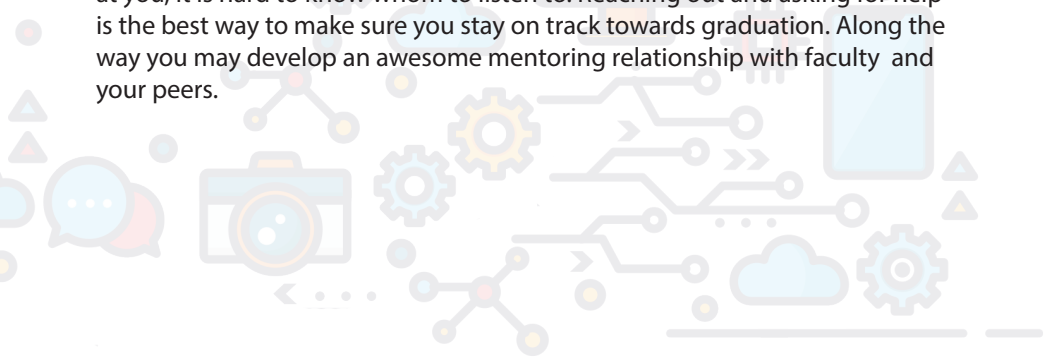
If you are interested in taking graduate courses, speak with your advisor. Graduate courses often offer more specialized topics that are only briefly touched upon in undergraduate courses and can count towards your specialization. If you are just interested in taking additional classes after finishing your required specialization courses, it is possible to transfer graduate-level classes towards a graduate degree (such as the Professional Masters) as long as they do not count towards your undergraduate degree. If you are interested in transferring credits into the Masters in Electrical Engineering (MEE) program at Rice or elsewhere, or using graduate courses for a specialization credit, discuss this with an advisor before making any assumptions.

## General Graduation Requirements (Don't forget your upper-levels!)

Please be aware of university requirements for graduation, all of which can be found in the General Announcements ([ga.rice.edu](http://ga.rice.edu)). Remember that 48 hours of all degree work must be in upper-level courses (300+) and more than half of the upper-level courses in the ELEC major must be completed in ECE. Just taking ECE upper-level courses in your specialization and through major requirements can get you very close, but you will almost certainly need to take elective and distribution classes that are upper-level as well.

## The Best Piece of Advice We Can Give You: Ask For Advice!

It may sound trite, but people are your most valuable resource. Talk with your professors and with other students. Meet with a Major Advisor in addition to your Divisional Advisor. We think this guide will be pretty useful, but talking over your plans with someone will do much more than any handbook can. We know you have lots of questions, and with so much advice being thrown at you, it is hard to know whom to listen to. Reaching out and asking for help is the best way to make sure you stay on track towards graduation. Along the way you may develop an awesome mentoring relationship with faculty and your peers.



## Divisional Advisors (DA)

You have to meet with your DA at least once during O-week, but we suggest you also make it a habit to talk to them periodically regarding your academic plans. All DAs have been trained to answer exactly the type of questions you have, and if they do not have the answer, they are sure to know somebody who does. Remember, as long as you are undeclared, your DA is your first point of contact for any academic questions.

## ECE Undergraduate Committee and Major Advisors

Particularly if your DA is not from the ECE department and if you are ahead of the game with some AP hours, you should think about consulting an ECE professor. Professor Gary Woods ([gary.woods@rice.edu](mailto:gary.woods@rice.edu)) heads up the Committee, and he is a great guy to talk to. The Committee knows the latest on the curriculum and has guided many ELECs towards their Rice degree. Also, the ECE Undergraduate Program Administrator, Norma Santamaría ([ns37@rice.edu](mailto:ns37@rice.edu)) can help with questions about course schedules, procedures for declaring a major, and applying to the MEE program. For details regarding the specifics of the MEE program contact Nyetta Meaux ([nfm2@rice.edu](mailto:nfm2@rice.edu)) Questions about advising may also be answered at [ece.rice.edu](http://ece.rice.edu).

## ECE Peer Academic Advisor

A few selected upper - level students with a diverse range of experience and excellence will be 'on-call' to help you out with anything academically related. ECE Peer Academic Advisors can target specifically to your ELEC needs. They can provide you with information from planning ahead for classes to even résumé writing for internships and research opportunities. Peer Advisors are chosen because they love to help and give advice, so don't hesitate to email a Peer Advisor to meet for a meal or a chat. Your Peer Academic Advisors for ECE can be found here: <https://oaa.rice.edu/peer-academic-advisors>.

## Upper - Level Students

Lastly, you have us! Your peers, with a few more years of experience tucked under our belts, are always willing to help. We can give you first-hand knowledge on what it really means to take a course, or tell you if your schedule is a bit on the heavy side. Most of us reference the curriculum we are graduating under, and chances are fresh memories of the class (and the problem sets) linger in our heads. Upper - level students can also share with you their research and internship experiences. Be warned though: the opinions you hear can differ widely depending on whom you talk to, and you should always take another student's advice with a grain of salt.



## Beyond the Classroom

### Study Abroad

Some reasons for studying abroad . . .



- College is a great time to go abroad
- You grow and gain new confidence
- It brings your studies to life
- You engage with the world and make new friends
- You will expand your professional options

Contrary to popular opinion, it is possible to study abroad and finish your degree in four years but it will require some advance planning on your part. It is usually suggested that ELECs interested in studying abroad do so during their third spring semester. Students often only think about studying abroad during the fall or spring but don't forget that you can also study abroad or even do research fellowships during the summer. Opportunities for such programs can be found through the Study Abroad Office, on bulletin boards, or through the ECE listserv. Remember, if you plan to study abroad, talk early and often with your advisors and the Study Abroad Office.

### Research

Like most Rice professors, ELEC professors are ecstatic if you show interest in their research, and asking a professor about their research is a sure-fire-way to let them know that you're interested. Over two thirds of ECE students participate in research of some kind. Attending the annual research fairs is another great way to stay in touch with what kind of work is being done at Rice. Research is a great way to get involved outside of the classroom, particularly during the summer.

You don't need to know anything beforehand to join or contribute to a research team. You can join in fall of your first year with no prior experience, so don't think you can't do it because you don't know enough yet! If you are at all interested in going to graduate school, research can help you decide whether or not grad school is the appropriate path for you. If research is something that interests you, pursuing it is as simple as emailing a professor and asking to attend one of the group's meetings!

## Beyond individual research

The Vertically Integrated Projects (VIP) Program at Rice offers an opportunity to do research in a team-based context while working on large-scale, multi-year and often multi-interdisciplinary projects. Undergraduate Rice VIP students earn academic credits, while faculty and graduate students benefit from the design/discovery efforts of their teams. VIP at Rice extends the academic design experience beyond a single semester. It provides the time and context to learn and practice professional skills, to make substantial contributions, and experience different roles on large multidisciplinary design/discovery teams. The long-term nature of VIP creates an environment of mentorship, with faculty and graduate students mentoring teams, experienced students mentoring new members, and students moving into leadership roles as others graduate. Rice VIP teams are comprised of students from first - year to graduate students, with a variety of majors and backgrounds. Prior registration is needed through ELEC 491. For more information on VIP visit the research section on the ECE site ([ece.rice.edu](http://ece.rice.edu))

## Beyond the BSEE: Dual degrees, double majors, minors or certificates?

A few students every year consider either double majoring in ELEC and COMP/MATH/PHYSICS or pursuing a dual degree. Even fewer end up doing it. It is usually possible to do with some AP credits, because so many classes overlap, and because many upper-level courses are cross-listed between them. Do not take this decision lightly. While it may not add many courses overall, it will restrict your schedule and the courses it does add will be very rigorous. One viable method of studying both ELEC and COMP is to start off your first year studying both to see what appeals to you and then dropping one (or not) accordingly. At the end of the day, you will undoubtedly be taking more classes and shouldering more work, but the skills you gain from those extra classes will always be incredibly useful.

## Internships

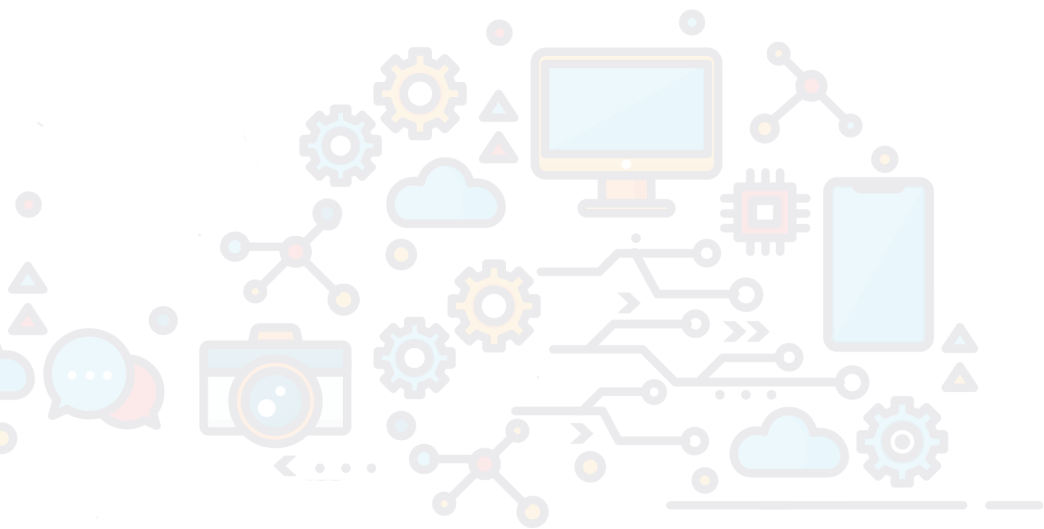
Besides research, a summer internship in industry is a great experience. It provides an opportunity for practical applications of theoretical course work. Like everything else, it is best to start early (recruiting starts in the fall). Most companies tend to hire second - year students or above, but there are a few that take first - year students. The ECE Department also has industry affiliates they can put you in contact with. There are also work abroad programs where you can work for a company domestically one summer and at an international branch the next.

There will be multiple events both virtual and on campus that help connect students with internship opportunities.

The career fairs that the Center for Career Development holds in the fall and spring are great places to meet employers. Occasionally, companies that come speak at IEEE lunches or events will also accept résumés. The ECE listserv often sends out postings for jobs as well.

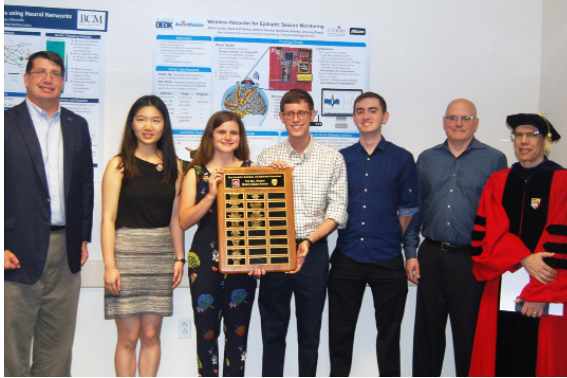
### Ethernest

The Ethernest is a design, ideation, and prototyping space dedicated to student engineering projects that fall outside the scope of normal classwork. It seeks to connect students of all different backgrounds and majors with the resources and community to pursue personal and group projects in a relaxed and fun environment. Makers, designers, artists, hackers, and those generally interested in building cool things are welcome at the Ethernest at all times. One great way to get involved is to attend one of its workshops. The space is located in Abercrombie Lab, room A119. You can visit their website here: [ethernest.rice.edu](http://ethernest.rice.edu).

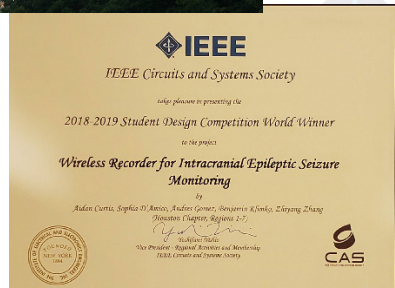


## Bill Wilson Lounge

The Wilson Lounge is a place specifically for students in the ECE department to meet, relax, and work on classwork together. It was funded by ECE Alumni support and continues to evolve as a resource for ELECs. The lounge is dedicated to the memory of Professor Bill Wilson, a beloved member of the ECE faculty and Resident Associate of Wiess College for more than 30 years. Located inside the undergraduate ECE lab in Abercrombie A147, the lounge is a central place to meet with and enjoy the company of other ELECs!



Last year's (2019) Bill Wilson award winners - Axon Mobile - went on to compete in Japan at the ISCAS 2019 meeting, where they won 1st place World for their project developed here at Rice. The Axon Mobile group invented a device to give patients with intractable epilepsy more freedom by using their instrument to gather signals from a patient's brain and sending them wirelessly for analysis.



## Need More Information?

You can visit the IEEE national webpage at [ieee.org](http://ieee.org) or the Rice Chapter of IEEE webpage at [ieee.rice.edu](http://ieee.rice.edu). Feel free to contact the presidents at [ieee@rice.edu](mailto:ieee@rice.edu) or any of the officers at their personal emails. We would love to talk to you more about anything ECE related!

## Get involved with Rice IEEE!

When in-person events are held on campus, IEEE regularly hosts weekly Friday lunches about research, industry, or whatever topic floats our boat, as well as ice cream socials after grueling 241 and 242 exams, and study breaks during midterms and finals. We also try to hold other events, such as research laboratory tours and company presentations. And did we mention we have quality free food at our events? Come out and get involved; the community is a major part of what makes Rice ECE special!

## Rice IEEE Officer Contact Information

### Co-Presidents



Kunal Rai  
[ksr3@rice.edu](mailto:ksr3@rice.edu)



Nicole Tan  
[nt13@rice.edu](mailto:nt13@rice.edu)

### Vice Presidents



Samantha Fuentes  
[sf26@rice.edu](mailto:sf26@rice.edu)



Nikhita Gangla  
[nikhita.gangla@rice.edu](mailto:nikhita.gangla@rice.edu)

### Communications



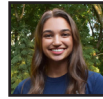
Fredy Martinez  
[fjm2@rice.edu](mailto:fjm2@rice.edu)

### Treasurer



Tucker Reinhardt  
[tbr1@rice.edu](mailto:tbr1@rice.edu)

### Junior Class Reps



Christina Crassas  
[cmc22@rice.edu](mailto:cmc22@rice.edu)



Ben Li Zaltsman  
[bz22@rice.edu](mailto:bz22@rice.edu)

### Sophomore Class Reps



Juan Cano Duenas  
[jc149@rice.edu](mailto:jc149@rice.edu)



Nick Thevenin  
[nit1@rice.edu](mailto:nit1@rice.edu)

# Rice Eta Kappa Nu Information

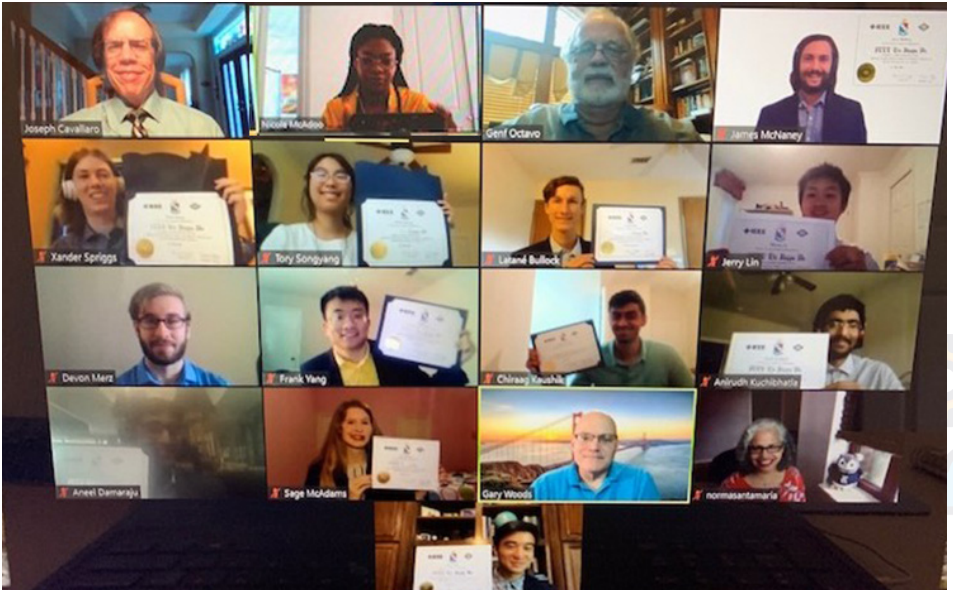
Eta Kappa Nu (HKN) is the national electrical engineering honor society. The Rice chapter of HKN (Theta Rho) is now a part of Rice IEEE and connects industry with Rice ELECs as well as provides information to undergraduates about possible academic decisions including course selection and graduate school.



**President**  
Andrew Pham



**Secretary**  
Frank Yang



2020 HKN Virtual Induction Ceremony





**B.S.E.E. Sample Schedule: Computer Engineering**  
**135 Semester Hours**

**Fall Semester**

**First Year - 18 Credits**

CHEM 121	General Chemistry with Lab	4
COMP 140*	Computational Thinking	4
MATH 101 or 105	Single Variable Calculus I	3
PHYS 101	Mechanics with Lab	4
FWIS	Freshman Writing	3

**Second Year - 17 Credits**

ELEC 241	Fundamentals of Electrical Engineering I	3
ELEC 240	Fundamentals of Electrical Engineering I Lab	1
ELEC 261	Electronic Materials & Quatum Devices	3
ELEC 326	Digital Logic Design	3
COMP 215	Intro to Program Design	4
DIST	Distribution Elective	3

**Third Year - 18 Credits**

ELEC 301	Introduction to Signals	3
ELEC 303	Random Signals	3
ELEC**	ECE Math/Science Elective	3
SPEC	ECE Specialization Elective (CE)	3
OPEN	Open Elective	3
OPEN	Open Elective	3

**Fourth Year - 16 Credits**

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (CE)	4
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3



\* COMP 140 in the fall followed by COMP 182 in the spring of your first year is strongly recommended for Computer Engineering.

\*\* Typically approved courses include: BIOS 201, CAAM 336, CAAM 378, CHEM 122/124, MATH 211, and MATH 222



## Spring Semester

### First Year - 16 Credits

ELEC 220	Fundamentals of Computer Engineering	4
MATH 102 or 106	Single Variable Calculus II	3
PHYS 102	Electricity and Magnetism with Lab	4
COMP 182	Algorithmic Thinking	4
LPAP	Lifetime Physical Activity Elective	1

### Second Year - 16 Credits

ELEC 242	Fundamentals of Electrical Engineering II	3
ELEC 244	Fundamentals of Electrical Engineering II Lab	1
ELEC 327	Design Lab Implementation of Digital Systems	3
MATH 212	Multivariable Calculus	3
MATH 355	Linear Algebra (or CAAM 335)	3
DIST	Distribution Elective	3

### Third Year - 18 Credits

ELEC 305	Introduction to Physical Electronics	3
SPEC	ECE Specialization Elective (CE)	4
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3

### Fourth Year - 16 Credits

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (CE)	4
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3



**B.S.E.E. Sample Schedule: Data Science/Systems**  
**134 Semester Hours**

**Fall Semester**

**First Year - 18 Credits**

CHEM 121	General Chemistry with Lab	4
COMP 140	Computational Thinking	4
MATH 101 or 105	Single Variable Calculus I	3
PHYS 101	Mechanics with Lab	4
FWIS	Freshman Writing	3

**Second Year - 18 Credits**

ELEC 241	Fundamentals of Electrical Engineering I	3
ELEC 240	Fundamentals of Electrical Engineering I Lab	1
ELEC 261	Electronic Materials & Quatum Devices	3
ELEC 326	Digital Logic Design	3
ELEC*	ECE Math/Science Elective	3
OPEN	Open Elective	3

**Third Year - 18 Credits**

ELEC 301	Introduction to Signals	3
ELEC 303	Random Signals	3
DIST	Distribution Elective	3
SPEC	ECE Specialization Elective (DS/S)	3
OPEN	Open Elective	3
OPEN	Open Elective	3

**Fourth Year - 15 Credits**

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (DS/S)	4
SPEC	ECE Specialization Elective (Other)	3
OPEN	Open Elective	3
OPEN	Open Elective	3



\*Typically approved courses include: BIOS 201, CAAM 336, CAAM 378, CHEM 122/124, MATH 211, and MATH 222

## Spring Semester

### First Year - 18 Credits

ELEC 220	Fundamentals of Computer Engineering	4
MATH 102 or 106	Single Variable Calculus II	3
PHYS 102	Electricity and Magnetism with Lab	4
DIST	Distribution Elective	3
OPEN	Open Elective	3
LPAP	Lifetime Physical Activity Elective	1

### Second Year - 16 Credits

ELEC 242	Fundamentals of Electrical Engineering II	3
ELEC 244	Fundamentals of Electrical Engineering II Lab	1
ELEC 305	Introduction to Physical Electronics	3
MATH 212	Multivariable Calculus	3
MATH 355	Linear Algebra (or CAAM 335)	3
DIST	Distribution Elective	3

### Third Year - 18 Credits

LAB	ECE Design Lab	3
DIST	Distribution Elective	3
SPEC	ECE Specialization Elective (DS/S)	3
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3

### Fourth Year - 15 Credits

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (DS/S)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3



**B.S.E.E. Sample Schedule: Neuroengineering**  
**134 Semester Hours**

**Fall Semester**

**First Year - 18 Credits**

CHEM 121	General Chemistry with Lab	4
COMP 140	Computational Thinking	4
MATH 101 or 105	Single Variable Calculus I	3
PHYS 101	Mechanics with Lab	4
FWIS	Freshman Writing	3

**Second Year - 16 Credits**

ELEC 241	Fundamentals of Electrical Engineering I	3
ELEC 240	Fundamentals of Electrical Engineering I Lab	1
ELEC 261	Electronic Materials & Quatum Devices	3
ELEC*	ECE Math/Science Elective (BIOS 201)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3

**Third Year - 18 Credits**

ELEC 301	Introduction to Signals	3
ELEC 303	Random Signals	3
ELEC 326	Digital Logic Design	3
SPEC	ECE Specialization Elective (NEURO)	3
OPEN	Open Elective	3
OPEN	Open Elective	3

**Fourth Year - 15 Credits**

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (NEURO)	3
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3



\*Typically approved courses include: BIOS 201, CAAM 336, CAAM 378, CHEM 122/124, MATH 211, and MATH 222

## Spring Semester

### First Year - 18 Credits

ELEC 220	Fundamentals of Computer Engineering	4
MATH 102 or 106	Single Variable Calculus II	3
PHYS 102	Electricity and Magnetism with Lab	4
DIST	Distribution Elective	3
DIST	Distribution Elective	3
LPAP	Lifetime Physical Activity Elective	1

### Second Year - 16 Credits

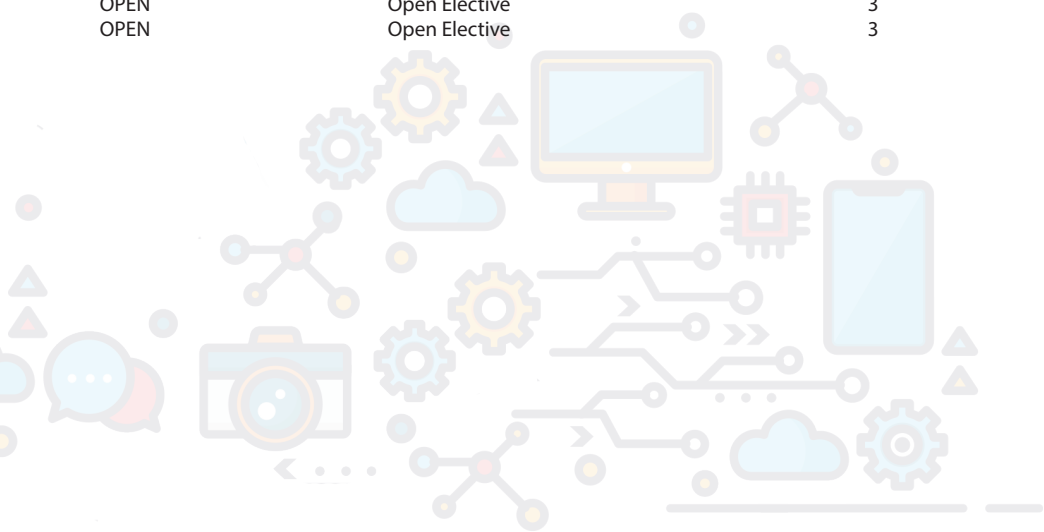
ELEC 242	Fundamentals of Electrical Engineering II	3
ELEC 244	Fundamentals of Electrical Engineering II Lab	1
ELEC 305	Introduction to Physical Electronics	3
MATH 212	Multivariable Calculus	3
MATH 355	Linear Algebra (or CAAM 335)	3
DIST	Distribution Elective	3

### Third Year - 18 Credits

LAB	ECE Design Lab	3
SPEC	ECE Specialization Elective (NEURO)	3
SPEC	ECE Specialization Elective (Other)	3
OPEN	Open Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3

### Fourth Year - 15 Credits

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (NEURO)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3



**B.S.E.E. Sample Schedule: Photonics, Electronics & Nanodevices (PEN)**  
**134 Semester Hours**

**Fall Semester**

**First Year - 18 Credits**

CHEM 121	General Chemistry with Lab	4
COMP 140	Computational Thinking	4
MATH 101 or 105	Single Variable Calculus I	3
PHYS 101	Mechanics with Lab	4
FWIS	Freshman Writing	3

**Second Year - 16 Credits**

ELEC 241	Fundamentals of Electrical Engineering I	3
ELEC 240	Fundamentals of Electrical Engineering I Lab	1
ELEC 261	Electronic Materials & Quantum Devices	3
DIST	Distribution Elective	3
DIST	Distribution Elective	3
OPEN	Open Elective	3

**Third Year - 18 Credits**

ELEC 301	Introduction to Signals	3
ELEC 303	Random Signals	3
ELEC 326	Digital Logic Design	3
OPEN	Open Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3

**Fourth Year - 15 Credits**

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (PEN)	3
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3



\* Typically approved courses include: BIOS 201, CAAM 336, CAAM 378, CHEM 122/124, MATH 211, and MATH 222

\*\* It is recommended that students take ELEC 262 for this elective.

## Spring Semester

### First Year - 18 Credits

ELEC 220	Fundamentals of Computer Engineering	4
MATH 102 or 106	Single Variable Calculus II	3
PHYS 102	Electricity and Magnetism with Lab	4
ELEC*	ECE Math/Science Elective	3
DIST	Distribution Elective	3
LPAP	Lifetime Physical Activity Elective	1

### Second Year - 16 Credits

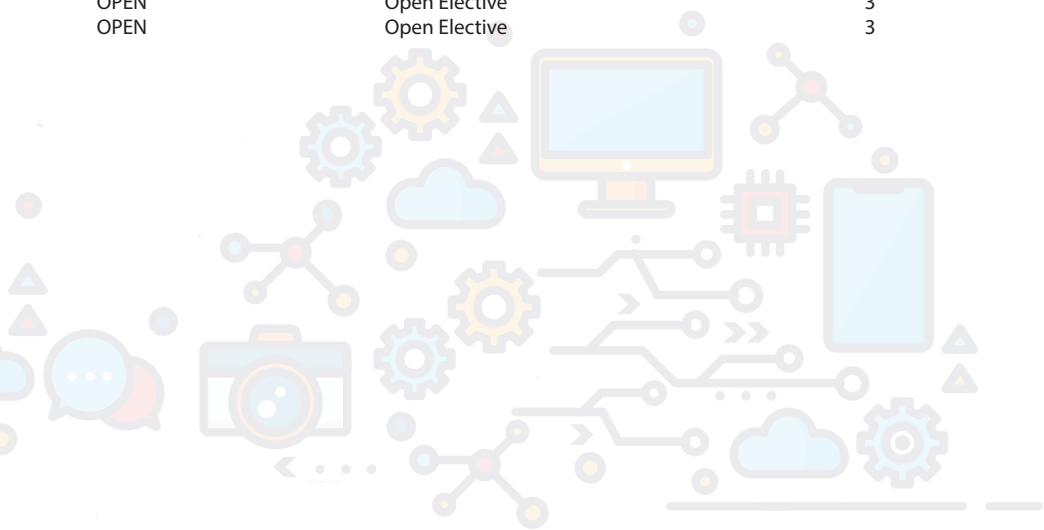
ELEC 242	Fundamentals of Electrical Engineering II	3
ELEC 244	Fundamentals of Electrical Engineering II Lab	1
ELEC 305	Introduction to Physical Electronics	3
MATH 212	Multivariable Calculus	3
MATH 355	Linear Algebra (or CAAM 335)	3
SPEC**	ECE Specialization Elective (PEN)	3

### Third Year - 18 Credits

LAB	ECE Design Lab	3
SPEC	ECE Specialization Elective (PEN)	3
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3

### Fourth Year - 15 Credits

ELEC 494	ECE Senior Design	3
SPEC	ECE Specialization Elective (Other)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3



B.A. Sample Schedule  
120 Semester Hours

Fall Semester

First Year - 15 Credits

COMP 140	Computational Thinking	4
MATH 101 or 105	Single Variable Calculus I	3
PHYS 101	Mechanics with Lab	4
FWIS	Freshman Writing	3
LPAP	Lifetime Physical Activity Elective	1

Second Year - 14 Credits

ELEC 241	Fundamentals of Electrical Engineering I	3
ELEC 240	Fundamentals of Electrical Engineering I Lab	1
ELEC 261	Electronic Materials & Quantum Devices	3
DIST	Distribution Elective	3
OPEN	Open Elective	4

Third Year - 15 Credits

ELEC 303	Random Signals	3
ELEC 326	Digital Logic Design	3
SPEC	ECE Specialization Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3

Fourth Year - 16 Credits

SPEC	ECE Specialization Elective	3
SPEC	ECE Specialization Elective	3
DIST	Distribution Elective	3
OPEN	Open Elective	4
OPEN	Open Elective	3





## Spring Semester

### First Year - 14 Credits

ELEC 220	Fundamentals of Computer Engineering	4
MATH 102 or 106	Single Variable Calculus II	3
PHYS 102	Electricity and Magnetism with Lab	4
DIST	Distribution Elective	3

### Second Year - 16 Credits

ELEC 242	Fundamentals of Electrical Engineering II	3
ELEC 244	Fundamentals of Electrical Engineering II Lab	1
MATH 212	Multivariable Calculus	3
MATH 355	Linear Algebra (or CAAM 335)	3
DIST	Distribution Elective	3
OPEN	Open Elective	3

### Third Year - 15 Credits

ELEC 305	Introduction to Physical Electronics	3
ELEC	ECE Design Lab	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3

### Fourth Year - 15 Credits

SPEC	ECE Specialization Elective	3
DIST	Distribution Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3
OPEN	Open Elective	3



## Mailing Lists

Be sure to sign up for the IEEE/ECE mailing list to keep up to date with all the latest ELEC news and events. Sign up during O-Week or other semester events, or email [ieee@rice.edu](mailto:ieee@rice.edu) at any time.

## Online Resources

For a list of undergraduate Major Advisors, and for the latest degree requirements and specialization electives:

General Announcements: [ga.rice.edu](http://ga.rice.edu)

Rice ECE Department: [ece.rice.edu](http://ece.rice.edu)



## Membership

There are more than 419,000 IEEE members in over 160 countries around the world. IEEE members are engineers, scientists, and allied professionals whose technical interests are rooted in electrical and computer sciences, engineering, and related disciplines.

## Communities

As the world's largest technical professional organization, IEEE offers a number of ways to get involved with technical and local communities. These communities are active participants in research and authorship, conferences, and important conversations about today's most relevant technical topics locally and globally.

## Conferences

IEEE sponsors more than 1,800 annual conferences and events worldwide, curating cutting-edge content for all of the technical fields of interest within IEEE.

## Publications

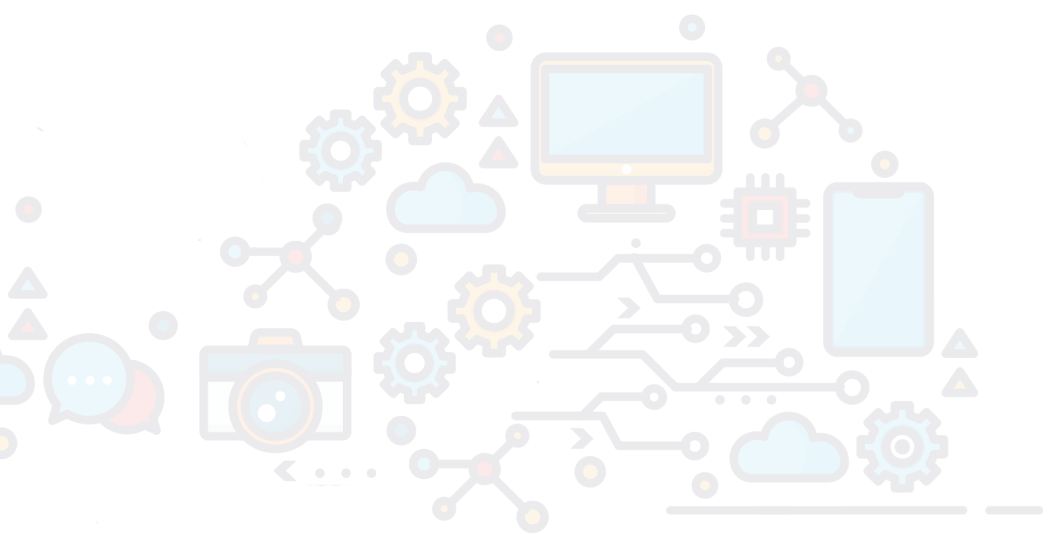
IEEE publishes nearly a third of the world's technical literature in electrical engineering, computer science, and electronics. This includes approximately 200 transactions, journals, and magazines published annually. In cooperation with John Wiley and Sons, Inc., IEEE also produces technical books, monographs, guides, and textbooks.

## Awards

Accomplishments in IEEE technical fields are recognized with annual awards for outstanding contributions to technology, society, and the engineering profession.

For more information on IEEE visit: <https://www.ieee.org>







## CONNECT:

[ieee.org](http://ieee.org)

[ieee.rice.edu](http://ieee.rice.edu)

[ece.rice.edu](http://ece.rice.edu)

[facebook.com/RiceECE](https://www.facebook.com/RiceECE)

[@RiceU\\_ECE](https://twitter.com/RiceU_ECE)



RICE ENGINEERING

Electrical and  
Computer Engineering