

Here is some general advice to first-semester graduate students in the CNSIP area.

1. The following categories of courses are relevant to all CNSIP students:

i. Core or Foundation Courses

- 600: Random Variables and Signals*: This is the area Core course that every CNSIP student needs to take
- 642: Information Theory and Source Coding
- 643: Stochastic Processes in Information Systems
- 645: Estimation Theory
- 647: Convex and Stochastic Optimization

The above courses are more mathematical in nature, and will be useful for multiple sub-areas

In addition to the above courses offered by CNSIP faculties, many CNSIP students also find the following courses useful as foundation for their research:

- 580: Optimization
- 602: Lumped Systems
- MATH 504: Real Analysis
- MATH 511: Linear Algebra

ii. For those students interested in signal and image processing, they may consider the following:

- 513: Fourier Optics (FO/CNSIP)
- 538: Digital Signal Processing 1*
- 577: Engineering Aspects of Remote Sensing
- 620: Introduction to Biomedical Imaging Systems
- 627: Introduction to Cryptography and Secure Communication
- 629: Introduction to Neural Networks
- 634: Digital Video Systems
- 637: Digital Image Processing 1*
- 638: Principles of Digital Color Imaging Systems
- 641: Model-Based Image Processing
- 645 Estimation Theory
- 661: Computer Vision (offered by CE)
- 662: Pattern Recognition and Decision Theory
- 695: Sparse Modeling and Algorithms
- 695: Structure and Dynamics of Large-Scale Networks (offered by AC)

iii. For those students interested in physical layer communications, they may consider the following:

- 544: Digital Communications*
- 639: Error Control Coding
- 642: Information Theory and Source Coding
- 645 Estimation Theory
- 678: Radar Engineering
- 679: Advanced Digital Communication

iv. For those students interested in networking, they may consider the following:

- 547: Introduction to Computer Communication Networks*
- 647: Convex and Stochastic Optimization
- 60022: Wireless Communication Networks
- 695: Inference Methods for Codes on Graphs
- 695: Large Scale Graphs (offered by AC)

v. For those students interested in machine learning:

- 595: ML1: Learning Theory
- 595: Intro to Deep Learning
- 570: Artificial Intelligence (Offered by CE area)
- 608: Algorithm (Offered by CE area)
- 629: Neural Network
- 662: Pattern Recognition (CE/CNSIP)
- 664: Complexity (Offered by CE area)
- BME/ECE 695: Deep Learning

2. QE courses:

In the above lists, those courses with an asterisk correspond to courses that can be used to fulfill the Ph.D. Qualifying Exam (QE) requirement. Ph.D. students are encouraged to fulfill the QE requirement in the first year or so, and thus are recommended to consider taking a set number of these courses earlier in their program.

3. For students who are searching for RA, they may consider taking more ECE courses in their first semester, so that they have more opportunity to interact with ECE faculty whom they may wish to work with. They are also encouraged to talk to the faculty early on whom they are interested in working with and ask about research opportunities.

4. In terms of course load, many students take 3 courses in their first semester. They usually register for ECE 600 (our area core course), and many students pick the other two from ECE 538, ECE 544, and ECE 547. Depending on other commitments (e.g., TA or RA), some students may take 2 courses, while others may take 4 courses.

5. This link (maintained by Prof. Charlie Bouman) contains the future offering schedule of some of the courses offered by CNSIP faculty:

<https://engineering.purdue.edu/~bouman/csp/courses/courses.pdf>

6. Start searching for internship if interested (Industrial Round-Table typically occurs in September).