PhD students will choose from a broad variety of TCSS 500-level elective courses on their way to the PhD Degree. These courses cover many different areas in Computer Science, including Data Science, Bioinformatics, Distributed Systems, Cyber-Physical Systems, GIS, and Cybersecurity. Students will need to complete at least 20 credits of elective coursework chosen from at least three concentrations.

### BIOINFORMATICS
- TCSS 555 Machine Learning
- TCSS 556 Advanced Machine Learning
- TCSS 588 Bioinformatics

### CYBERSECURITY
- TCSS 576 Wireless and Systems Security
- TCSS 581 Cryptology
- TCSS 582 Cryptographic Protocols
- TCSS 583 Post-Quantum Cryptosystems
- TCSS 584 Testing VLSI Circuits and Hardware Security

### GEOPHYSICAL INFORMATION SYSTEMS (GIS)
- TCSS 565 Spatial Databases with Applications in Geographic Information Systems

### DATA SCIENCE
- TCSS 551 Big Data Analytics
- TCSS 554 Information Retrieval & Web Search
- TCSS 555 Machine Learning
- TCSS 556 Advanced Machine Learning

### CYBER-PHYSICAL SYSTEMS
- TCSS 569 Intro to Cyber-Physical Systems
- TCSS 570 Intro to Parallel Computing
- TCSS 571 Wireless & Mobile Networking
- TCSS 573 Internet of Things
- TCSS 574 Cyber Electromagnetics
- TCSS 576 Wireless and Systems Security

### DISTRIBUTED SYSTEMS
- TCSS 531 Cloud & Virtualization Systems Engineering
- TCSS 559 Services Computing
- TCSS 562 Software Engineering for Cloud Computing
- TCSS 570 Intro to Parallel Computing
- TCSS 571 Wireless & Mobile Networking
- TCSS 573 Internet of Things
- TCSS 576 Wireless and Systems Security

### INTERDISCIPLINARY ELECTIVES
- TCSS 510 Enterprise Architecture Foundations
- TCSS 511 Advanced Enterprise Architecture
- TCSS 535 AI and Knowledge Acquisition
- TCSS 540 Theory of Computing
- TCSS 544 Linear Algebra
- TCSS 545 Database Systems Design
- TCSS 552 Interaction Design
- TCSS 554 Database Systems Internals
- TCSS 578 Virtual Reality
- TCSS 580 Information Theory