

Doctor of Philosophy (PhD) Program (Research-based – Research Intensive)

1. Curriculum Structure

The structure of the PhD program is as follows:

Curriculum Components	Total Courses	Total Cr Hrs
Core Courses	1	3
Required Courses in Major	-	-
Elective Courses in Major	3	9
Concentration		
Minor		
Free Electives (if Applicable)		
Others: Thesis	1	48
Total	5	60

2. Study Plan

The typical three years study plan can be represented as follows:



3. Degree Requirements

A minimum of 60 credit hours are required to complete the Doctor of Philosophy in Engineering, including the following:

- A 3 credit hours Core Course (DENG 702: Applied Research Methodology)
- A minimum of 9 credit hours in Concentration Elective Courses
- A minimum of 48 credit hours for the PhD Thesis
- Passing the comprehensive examination
- Passing the candidacy examination
- Passing the Dissertation Defense

Concentration in Electrical Engineering

Students who choose the Electrical Engineering Concentration Area must complete 9 CH in the Electrical Engineering Electives package and 48 CH in the Electrical Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Electrical Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: ELEC 708: Advanced Optimization Methods ELEC 752: Advanced Special Topics I ELEC 752: Advanced Special Topics II ELEC 753: Multimedia Processing ELEC 763: Electric Power Generation by Renewable Sources ELEC 764: Modern Radio Frequency Communication Systems ELEC 767: Machine Learning ELEC 768: Non-Linear Control Systems ELEC 769: Detection and Estimation Theory

Electrical Engineering Thesis Requirement

Students must complete the following courses: ELEC 899 PhD Thesis

Concentration in Civil Engineering

Students who choose the Civil Engineering Concentration Area must complete 9 CH in the Civil Engineering Electives package and 48 CH in the Civil Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Civil Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: CVEN 710: Advanced Special Topics I CVEN 711: Advanced Special Topics II CVEN 712 : Advances in Civil Engineering Practice and Research

Civil Engineering Thesis Requirement

Students must complete the following courses CVEN 899 PhD Thesis

Concentration in Mechanical Engineering

Students who choose the Mechanical Engineering Concentration Area must complete 9 CH in the Mechanical Engineering Electives package and 48 CH in the Mechanical Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Mechanical Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: DENG 704: Project Management MECH 720: Finite Element Analysis MECH 701: Advanced Thermodynamics MECH 702: Solar Energy Utilization MECH 741: Advanced Special Topics I MECH 742: Advanced Special Topics II

Mechanical Engineering Thesis Requirement

Students must complete the following courses: MECH 899 PhD Thesis

Concentration in Materials Science and Engineering

Students who choose the Materials Science and Engineering Concentration Area must complete 9 CH in the Materials Science and Engineering Electives package and 48 CH in the Materials Science and Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Materials Science and Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: DENG 704: Project Management MECH 726: Advanced Physical Metallurgy MSCE 761: Special Topics I MSCE 762: Special Topics II

Materials Science and Engineering Thesis Requirement

Students must complete the following courses: MSCE 899 PhD Thesis

Concentration in Industrial and Systems Engineering

Students who choose the Industrial and Systems Engineering Concentration Area must complete 9 CH in the Industrial and Systems Engineering Electives package and 48 CH in the Industrial and Systems Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Industrial and Systems Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: IENG 756: Supply Chain and Logistics IENG 757: Systems Analysis and Design IENG 758: Robotics and Automation Technology IENG 751: Advanced Special Topics I

Industrial and Systems Engineering Thesis Requirement

Students must complete the following courses: IENG 899 PhD Thesis

Concentration in Engineering Management

Students who choose the Engineering Management Concentration Area must complete 9 CH in the Engineering Management Electives package and 48 CH in the Engineering Management Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Engineering Management Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: EMP 752: Advanced Special Topics II DENG 704: Applied Statistics Techniques DENG 724: Innovation and Technology Management DENG 725: Sustainable Development DENG 726: Modelling and Simulation

Engineering Management Thesis Requirement

Students must complete the following courses: EMP 899 PhD Thesis

Concentration in Environmental Engineering

Students who choose the Environmental Engineering Concentration Area must complete 9 CH in the Environmental Engineering Electives package and 48 CH in the Environmental Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Environmental Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses:

- EEMP 721: Solid Waste Management
- EEMP 724: Environmental Sustainability
- EEMP 725: Industrial Waste Water Treatment
- EEMP 733: Renewable and Sustainable Energy Systems
- EEMP 751: Advanced Special Topics in Environmental Engineering-I
- EEMP 752: Advanced Special Topics in Environmental Engineering-II

Environmental Engineering Thesis Requirement

Students must complete the following courses: EEMP 899 PhD Thesis

Concentration in Chemical Engineering

Students who choose the Chemical Engineering Concentration Area must complete 9 CH in the Chemical Engineering Electives package and 48 CH in the Chemical Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Chemical Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: CHME 750: Transport Phenomena CHME 751: Special Topic I CHME 752: Special Topic II CHME 753: Advanced Process Dynamics and Control CHME 761: Bioprocess Engineering CHME 762: Advanced Chemical Engineering Thermodynamics CHME 763: Advanced Reaction Engineering

Chemical Engineering Thesis Requirement

Students must complete the following courses: CHME 899 PhD Thesis

Concentration in Computer Science

Students who choose the Computer Science Concentration Area must complete 9 CH in the Computer Science Electives package and 48 CH in the Computer Science Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Computer Science Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: CMPT 711: Visual Computing CMPT 712: Network Security CMPT 723: Distributed Systems and Cloud Computing CMPT 742: Information Security CMPS 753: Big Data analytics CMPT 771: Algorithm Design and modeling CMPT 773: Machine Learning CMPT 782: Special Topics in Computer Science

Computer Science Thesis Requirement

Students must complete the following course: CMPS 899 PhD Thesis

Concentration in Computer Engineering

Students who choose the Computer Engineering Concentration Area must complete 9 CH in the Computer Engineering Electives package and 48 CH in the Computer Engineering Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Computer Engineering Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: CMPT 702: Advanced Robotics CMPT 710: Embedded Computing Systems CMPT 711: Visual Computing CMPT 712: Network Security CMPT 741: Advanced Computer Networks CMPT 743: Wireless Communication CMPT 773: Machine Learning CMPT 783: Special Topics in Computer Engineering

Computer Engineering Thesis Requirement

Students must complete the following course: CMPT 899 PhD Thesis

Concentration in Architecture

Students who choose the Architecture Concentration Area must complete 9 CH in the Architecture Concentration Electives package and 48 CH in the Architecture Concentration Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Architecture Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses:
PHAP 701: Participatory Design and Planning
PHAP 702: Architecture and Urbanism of Globalized Cities
PHAP 710: Building Performance Assessments and Measurements
PHAP 711: History, Theory, and Criticism in Architecture

PHAP 712: Energy and BuildingsPHAP 751: Advanced Special Topics in Architecture IPHAP 752: Advanced Special Topics in Architecture II

Architecture Thesis Requirement

Students must complete the following courses: PHAP 899 PhD Thesis

Concentration in Urban Planning

Students who choose the Urban Planning Concentration Area must complete 9 CH in the Urban Planning Concentration Electives package and 48 CH in the Urban Planning Concentration Thesis Requirement package as detailed below. The students also have the option to take a maximum of 1 graduate level course (3CH) from outside the program but within QU upon the program coordinator approval.

Urban Planning Electives package (9 Cr Hrs)

Students must complete 9 credit hours from the following courses: PHAP 702: Architecture and Urbanism of Globalized Cities MUPD 700: Planning Theory MUPD 752: Theory of Urban Form and Design PHAP 701: Participatory Design and Planning PHUP 753: Sustainable Urbanism PHUP 751: Advanced Special Topics in Urban Planning I PHUP 752: Advanced Special Topics in Urban Planning II

Urban Planning Thesis Requirement

Students must complete the following courses: PHUP 899 PhD Thesis