DOCTORATE OF PHILOSOPHY
ENGINEERING SCIENCE WITH CONCENTRATION IN CONSTRUCTION MANAGEMENT

Course Requirements

Ph.D. 54 credit hours (with a BS degree)

The Construction Management concentration requirements for PhD students are described below. A total of 54 credit hours are required. Courses should be from at least two different departments with a minimum of 6 hours from each department. Courses should also be from two colleges with a minimum of 3 hours from each college. At least half of the course work (27 semester hours) must be taken in courses offered by engineering departments within the college. Requirements include 24 hours of course work concentrated in at least two sub-areas of specialization within one or more academic departments. The remaining 30 semester hours of course work must contain no more than 15 hours in any one department.

Required Courses: (13 credit hours)

1. HRE 7901 Research Methods or equivalent
2. EXST 7004, 7005, 7006 or equivalent
3. Six credit hours in construction management courses. The six credit hours can be selected from the following list. An updated list of courses can be found in the CM department website:
   - CM 7110 Advanced Productivity
   - CM 7203 Advanced Sustainable Construction
   - CM 7030 Project Delivery
   - CM 7111 Construction Scheduling and Diagnostics
   - CM 7213 Soils in Construction
   - CM7220 BIM
   - CM 7150 Decision Making tools for CM
   - CM 7230 Lean construction
   - CM 7211 Construction Dispute resolution
   - CM 7250 Natural Hazard Resistant Construction

Additional Courses: 41 additional credit hours are needed. For these additional courses, the student can select a focus area or choose a more generic path. Focus areas include:

- Advanced Materials & Sustainability (sub areas are Material science and Sustainable engineering)
- Building Science For Disaster-Resistant Communities (Sub areas are Disaster Science and Management, Civil Engineering, Computer Science & Engineering, Experimental Statistics, Geography)
- Built Environment Informatics (Sub areas are Analytics of Building or Urban Sustainability and Virtual Construction and Simulation
- Capital Facility Management (subareas are Business administration, Lean construction, Industrial engineering)
- Generic Path (other technical electives) – Students can select the remaining 41 credits from any course offered within LSU.
PES - Construction Management

Major Area (30 CHs)*: Advanced Material & Sustainability (30 CHs)
Subareas (24CH):
• Material science (A CHs)
• Sustainable engineering (B CHs)
  • A+B = 24CH

Major Area (30 CHs)*: Building Science For Disaster-Resistant Communities (30 CHs)
Subareas (24CH):
• Building science (A CHs)
• engineering Hazards and environment (B CHs)
  • A+B = 24CH

Major Area (30 CHs)*: Built Environment Informatics (30 CHs)
Subareas (24CH):
• Analytics of Building or Urban Sustainability (A CHs)
• Virtual Construction and Simulation (B CHs)
  • A+B = 24CH

Major Area (30 CHs)*: Capital Facility Management (30 CHs)
Subareas (24CH):
• Business administration (A CHs)
• Industrial engineering (B CHs)
  • A+B = 24CH

Major Area (30 CHs)*: Interdisciplinary Research in Construction (30 CHs)
Subareas (24CH):
• Define Subarea 1 (A CHs)
• Define Subarea 2 (B CHs)
  • A+B = 24CH

* The major area (30 CHs) include the core courses.
Courses list for Advanced Materials and Construction Sustainability option are:

1. EVEG 4154 Sustainable Engineering
2. ME 4723 Advanced Materials Analysis (SEM)
3. ME 7723 Materials Characterization Using Electron Beam Methods (TEM)
4. CE 7485 Mechanics of Composite Materials
5. CE 4440 Advanced Mechanics of Materials
6. CE 7475 Solids Mechanics
7. CE 7450 Energy Principles in Engineering Mechanics Processing and Manufacturing
8. ME 7743 Defects, Diffusion and Phase Transformations in Materials
9. PHYS 4141, 4142 Intro to Quantum Mechanics
10. CE 7480 Plasticity and Viscoelasticity : Theory and Applications
11. CE 4450 Finite Element Methods
12. CE 7455 Finite Element Method in Engineering
13. CHEM 7251 Elemental Analysis
14. CHEM 7750 Special topics of Analytical Chemistry (Electrochemistry)
15. CHEM 7770 Special topics in Inorganic Solid State and Materials Chemistry
16. CE 7485 Mechanics of Composite Materials
17. CHE 7582 Polymerization and Polycondensation Processes
18. ME 4743 Kinetics in Materials Processes
19. ME 4783 Composite Materials: Manufacturing, Properties & Design
20. EE 7244 Advanced Lithography
21. CE 7650 Bituminous Materials and Mixtures
22. CE 4650 Asphalt Mix Design
23. ME 4433 Heat transfer
24. ME 7433 Advanced Heat transfer I
25. ME 7443 Advanced Heat transfer II
26. ENV 4101 Environmental Chemistry
27. ENV 4261 Energy and Environment
28. ENV 7043 Environmental Law and Regulation
29. ENV 7040 Environmental Planning and Management
30. ENV 7047 Environmental Economics and Policy
31. EXST 7014, 7015, 7016 or equivalent
32. CE 4651 Concrete Materials and Mixtures
33. CM 7206 Special topics
34. CM 7207 Independent studies
35. CE 7345 In-Situ Testing and Evaluation

Courses list for Building Science For Disaster-Resistant Communities option are:

1. ARCH 4440 Louisiana Tectonics
2. CE 4560 Engineering Applications of Remote Sensing
3. CE 4200 Hydrology
4. CE 4310 Geotechnical Engineering III: Deep Foundations
5. CE 4320 Coastal Engineering
6. CE 4440 Advanced Mechanics of Materials
7. CE 4445 Hurricane Engineering
8. CE 4560 Engineering Applications in Remote Sensing
9. CE 7405 Statically Indeterminate Structures
10. CE 7430 Structural Design for Dynamic Loads
11. CE 7455 Finite Element Methods in Engineering
12. CE 7700 Reliability in Structural Engineering
13. CE 7701 Special Topics- Wind Engineering
14. CSC 4402 Introduction to Database Management Systems
15. CSC 7333 Machine Learning
16. CSC 7700 Knowledge Discovery
17. DSM 7000 Policies and Practices of Emergency Management
18. DSM 7910 Seminar
19. EVEG 4154 Sustainability Engineering
20. EXST 7015 Statistical Techniques II
21. EXST 7034 Regression Analysis
22. EXST 7036 Categorical Data Analysis
23. EXST 7037 Multivariate Statistics
24. EXST 7039 Statistical Methods for Reliability and Survival Data
25. EXST 7060 Probability and Statistics
26. EXST 7152 Advanced Topics in Statistical Modeling
27. GEOG 4046 Webmapping
28. GEOG 4047 Intro to GIS
29. GEOG 4048 Methods of Spatial Analysis
30. GEOG 4997 GIS/Remote Sensing
31. GEOG 7914 Climate Extreme Events
32. GEOG 7935 Quantitative Methods for Geographical Analysis
33. GEOG 7946 Coastal Resources
34. GEOG 7973 Advanced Geographic Information System
35. MATH 4038 Mathematical Methods in Engineering
36. OCS 4410 Ecosystems Modelling
37. OCS 8900 Hurricanes and Typhoons

Courses list for Built Environment Informatics option are:

1. ARCH4062 Urban Design and Planning
2. CE7640 Urban Transportation Policy and Planning
3. CE7641 Urban Transportation Planning Models
4. CSC4243 Interface Design and Technology
5. CSC4263 Video Game Design
6. CSC4356/ME4573 Interactive Computer Graphics
7. CSC4357/ME4583 Applied Computer Graphics
8. CSC4402 Introduction to Database Management Systems
9. CSC4512 Optimization: Modeling Approaches, Algorithms and Applications
10. CSC4444 Artificial Intelligence
11. CSC7300 Algorithm Design and Analysis
12. CSC7333 Machine Learning
13. CSC7375 Robot Vision
14. CSC7402 Database Management Systems
15. CSC7442 Data Mining and Knowledge Discovery
16. CSC7443 Scientific Information Visualization
17. CSC7444 Advanced Artificial Intelligence
18. CSC7481 Information Retrieval Systems
19. CSC7600 High Performance Computing
20. ECON4130 Urban and Regional Economics
21. ECON4320 Environmental Economics
22. ECON4325 Applied Resource Economics
23. ECON7610 Mathematics for Economists
24. ECON7630 Econometric Methods
25. ECON7631 Econometric Methods II
26. ENVS7010 Mathematical Modeling in Energy and Environmental Management
27. ENVS7040 Environmental Planning and Management
28. EXST7014, 7015, 7016 or Equivalent
29. GEOG4045 Environmental Remote Sensing
30. GEOG4047 Geographic Information Systems
31. GEOG4048 Methods of Spatial Analysis
32. GEOG7935 Quantitative Methods for Geographical Analysis
33. GEOG7973 Advanced Geographic Information Systems
34. GEOG7975 Advanced Remote Sensing Seminar
35. IE4425 Information System Engineering
36. IE4426 Distributed Information Systems Engineering
37. IE4520 Supply Chain Logistics II
38. IE4540 Reliability Engineering
39. IE7425 Advanced Information Systems Engineering
40. IE7428 Semantic Analysis
41. IE7455 Lean Process Improvements
42. IE7541 Linear Programming Algorithms
43. IE7561 Programming Methods in Operations Research
44. IE7565 Metaheuristics
45. IE7768 Sequencing and Scheduling
46. OCS4410 Ecosystem Modeling and Analysis
47. PSYC7030 Cognitive Basis of Behavior
48. PSYC7040 Social Basis of Behavior
49. PSYC7948 Research Methodology and Application in Behavior Analysis
Courses list for Capital Facilities Management courses options:

1. IE 4362 Advanced Engineering Statistics
2. IE 4425 Information Systems Engineering
3. IE 4453 Quality Control and Six Sigma
4. IE 4461 Human Factors
5. IE 4520 Supply Chain Logistics II
6. IE 4530 Lean Manufacturing Systems
7. IE 7466 Human Interaction with Computers
8. IE 7541 Linear Programming Algorithms
10. IE7762 Supply Chain Sys
11. IE7764 Logistics & Dist
12. IE7768 Sequencing & Scheduling
13. EXST 7014, 7015, 7016 or equivalent
14. CSC 4890 Introduction to Theory of Computation
15. CSC 7001 Computing principles I
16. CSC 7002 Computing Principles II
17. CSC 7101 Programming Languages Structures
18. CSC 7300 Algorithm Design and Analysis
19. CM 7206 Special topics
20. CM 7207 Independent studies
21. CMST 4113 Communication and Leadership in Teams
22. KIN 4513 Facilities Management
23. IE 4540 Reliability Engineering
24. DSM 4600 Crisis Management
25. ENVS 7040 Environmental Planning and Management
26. ENVS 7042 Environmental Conflict Resolution
27. ENVS 7045 Land Use Law and Regulation
28. ENVS 7700 Integrated Environmental Issues
29. EVEG 4153 Hazardous Waste Management
30. FIN 7310 Real Estate Financial Decisions
31. HRE 7723 Leadership and Organization
32. HRE 7571 Performance and Needs Analysis in Human Resources Development
33. HRE 7575 Managing Change in Organizational Systems
34. HRE 7725 Leadership Development Strategies in Organizations
35. HRE 7727 Advanced Leadership Theory and Practice
36. ISDS 4113 Information Technology Project Management
37. ISDS 4180 Business Analysis in Practice
38. ISDS 7230 Project Management
39. ISDS 7501 Information Systems
40. ISDS 7535 Information Technology Management