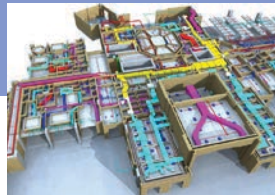




Remember
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times
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creditable



DOCTOR OF PHILOSOPHY IN CIVIL ENGINEERING

■ FACULTY OF ENGINEERING

DOCTOR OF PHILOSOPHY IN CIVIL ENGINEERING

The Ph.D. in Civil Engineering program is research-intensive, designed for the pursuit of advanced interdisciplinary studies focusing on application in industrial settings. The main mission is to support rapidly progressing social and economic development leading to more complex demands in engineering skills, such as research and development in technology for modern industries, requiring and depending more on knowledge capital than traditional labor-intensive human capital or materials.

Three of our outstanding research centers devoted to the field include:

- Research Centers for Industrial Design, Decision and Development: ID³, and Bridge and Railway Structural Systems Research Unity Infrastructure and Transportation Center
- Development and Research of Innovative Vehicle Engineering: DRIVE
- Mechatronics and Industry Laboratory: MI-LAB.



Objectives

Graduates from the program are expected to master the following:

- Advanced knowledge and expertise in civil engineering research.
- Competitive competence at international standards.
- Professional ethics.

Admission

In accordance with the Graduate School Rules and Regulations. The program committee reserves the rights to require more qualifications as deemed appropriate.

Medium of Instruction

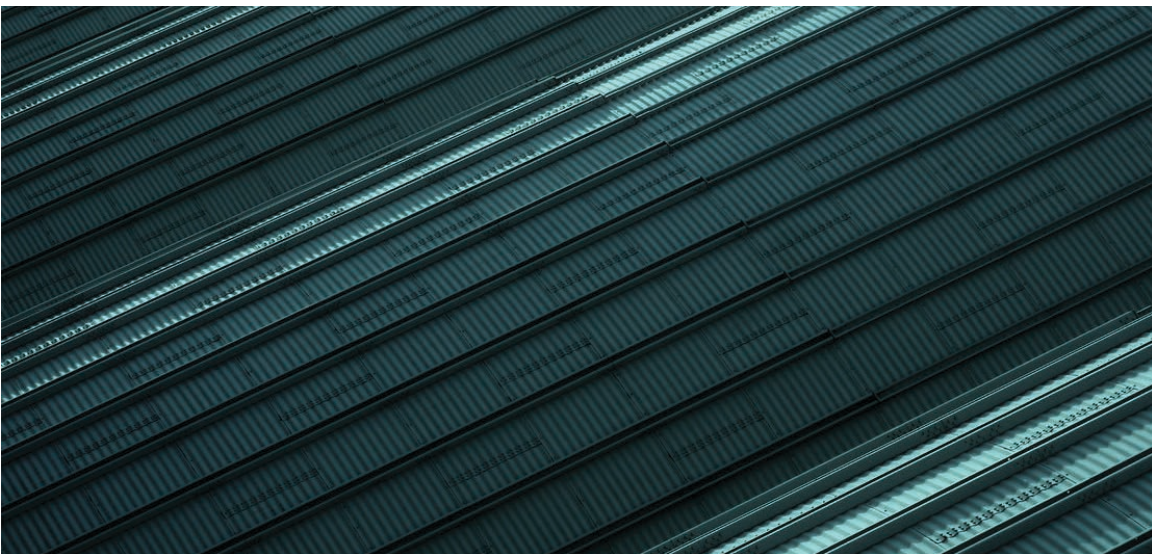
Thai and English

Research Focus

- Infrastructure
- Transportation
- Industrial Applications

Requirement for Graduation

Apart from the Graduate School Rules and Regulations, doctoral candidates are required to publish a part of the dissertation in an academic journal and pass the criteria or coursework, English competency, and oral defense of the dissertation.



5. Dissertation Credit Requirements.

Requirements	Option 1.1		Option 2.1	
	Course No.	Credits	Course No.	Credits
Dissertation 1, Type 1.1	304684	3	-	-
Dissertation 2, Type 1.1	304685	9	-	-
Dissertation 3, Type 1.1	304686	9	-	-
Dissertation 4, Type 1.1	304687	9	-	-
Dissertation 5, Type 1.1	304688	9	-	-
Dissertation 6, Type 1.1	304689	9	-	-
Dissertation 1, Type 2.1	-	-	304691	3
Dissertation 2, Type 2.1	-	-	304692	3
Dissertation 3, Type 2.1	-	-	304693	3
Dissertation 4, Type 2.1	-	-	304694	9
Dissertation 5, Type 2.1	-	-	304695	9
Dissertation 6, Type 2.1	-	-	304696	9
Total	6	48	6	36

Course Descriptions

304601 Statistics, Probability and Reliability for Civil Engineers 3(3-0-6)

A study of the following: data analysis, probability concepts, random variables, probability distributions, model estimation and testing, methods of regression and multivariate analysis, frequency analysis of extreme events, simulation techniques, risk and reliability analysis, and Bayesian decision models and parameter uncertainty.

304611 Seismic Design of Structures 3(2-2-5)

Elementary engineering seismology, seismic waves-intensity and magnitude, response spectrum and design for earthquakes earthquake analysis and codes, response spectrum analysis, random vibrations, artificial generation of earthquake records, structural design and detailing for earthquake resistance of special structures, such as bridges, dams, and nuclear power plants.

304612 Structural Limit Design 3(2-2-5)

A study of the following topics: limit analysis theory, limit state design in steel and reinforced concrete structures and their application to continuous beams and frames, control of deflection and cracking, yield line analysis by virtual work and equilibrium methods, application to slabs of various types, and Hillerbor's strip method.

304613 Advanced Finite Element Analysis 3(3-0-6)

A study of advanced techniques in finite element analysis, finite element analysis in continuum mechanics problems, Lagrangian and Eulerian formulations, materially and geometrically nonlinear analysis, thick plate and shell analysis boundary element method, and application of finite elements to fracture mechanics.

304614 Stability of Structures**3(3-0-6)**

An examination of the following: structural stability theory; elastic and inelastic buckling; torsional and lateral buckling of beams, columns, beam-column, and frames; dynamic stability; and recent developments and the evaluation of design procedures for structural instability problems.

304615 Structural Design for Dynamic Loads**3(2-2-5)**

Structural design problems due to being subjected to dynamic excitations including earthquakes, Tsunamis, wind, blast, traffic, and machinery excitations; human sensitivity to vibrations; mechanical behavior of structural elements under dynamic excitation; responses to earthquakes and earthquake resistant design; wind loading; damping in structures; hysteretic energy dissipation and ductility requirements; and design codes.

304616 Selected Topics in Structural Engineering**3(3-0-6)**

Selected topics in structural engineering of current interest in the research or labour market fields and presentation of a term paper.

304621 Computer Based Construction Project Management**3(3-0-6)**

A study of the initiation of construction projects, information management tools, network diagrams, time and cost estimation, critical path analysis for network scheduling, scheduling of linear and repetitive projects, resource allocation and leveling, time-cost tradeoffs, bidding strategy and markup estimation, project financing and schedule integration, and construction progress control.

304622 Construction Industry Law**3(3-0-6)**

Legal concepts applicable to the construction industry; managing legal aspects including contract administration, contract performance, contract flexibility and change orders; liability and negligence, dispute avoidance and resolution; and bonds and insurance.

304623 Construction Contracting**3(3-0-6)**

Construction contracting for contractors, designers, and owners; specifications organisation and administration; construction industry structure; construction contracts – bonds, insurance, planning, estimating, and control; quantity takeoff and pricing; materials and equipment estimates; proposal preparation; scheduling; accounting and controlling; and using contract documents to prepare detailed estimates.

304624 Management of Engineering and Construction Organization 3(3-0-6)

Management of design and construction companies in the architecture-engineering construction industry, management of risks inherent in the A/E/C industry: developing business strategies and organizations to cope with cyclical demand, alternative contracting approaches, managing cash flow, administration of human resources, safety, quality, insurance, and bonding; leadership and negotiation.

304625 Managing Sustainable Building Projects**3(3-0-6)**

Managing the life cycle of buildings from the owner, designer, and contractor's perspectives emphasizing sustainability goal methods to define, communicate, coordinate, and manage multidisciplinary project objectives including scope, quality, life cycle cost and value schedules, energy and social concerns; roles, responsibility, and risks for project participants; and lifecycle assessment methods.

304626 Selected Topics in Construction Engineering**3(2-2-5)**

A study of selected topics in construction engineering and management which are currently of interest in the research and labour market fields, and the presentation of a term paper.

304631 Transportation and the Environment**3(3-0-6)**

Studying, analyzing, and evaluating aspects of the environment and the impacts of transport systems, visual impacts on the environment and traffic congestion, noise and air pollution from transport, mathematical simulation models for predicting the noise impact of traffic projects, and environmental laws and regulations in transport.

304632 Discrete Choice Analysis**3(3-0-6)**

A study of the theories of individual choice behavior, binary choice models, the multinomial choice model, relevant statistical tests and issues, aggregation and sampling of alternatives, multidimensional choice and nested logic models, and design and development of discrete choice models and their applications in transport engineering.

304633 Traffic Management**3(3-0-6)**

Descriptions of current traffic congestion problems, the necessity to apply supply and demand measures, a detailed catalogue of congestion management measures, land use zoning, telecommunications substitutes, travel information services, economic measures, administrative measures, road traffic operations, preferential treatments, public service operations, freight movements, reviews of existing policies, plans and programs for the effective implementation of congestion management measures, future congestion, management, and the influence of new policies and technologies.

303643 Logistics and Freight Transportation**3(3-0-6)**

Logistics and transportation, decision making systems, logistics network planning, facilities planning, freight transportation planning, inventory modeling, and recent trends in logistics.

304635 Highway and Road Safety**3(3-0-6)**

An examination of road safety problems and the analysis of road safety problems, human factors in road safety, principles of designing safe roads, road management strategies at hazardous locations, traffic control devices and their application to promote safer roads, road safety policies and planning, techniques for road safety operation, road safety audits, and black spot improvement.

304636 Selected Topics in Transportation Engineering**3(2-2-5)**

Selected topics in transportation engineering currently of interest in the research and labour market fields, and presentation of a term paper.

304641 Modeling of Hydrologic Processes**3(3-0-6)**

Mathematical modeling and numerical solutions for hydrologic processes, rainfall losses and runoff, empirical and process based models, lumped and distributed parameter models, other modeling considerations, model capability and accuracy, and model parameter optimisation.

304642 Computational Hydraulics**3(3-0-6)**

A study of the following: equations and numerical solution techniques for hydraulic problems, open channels and rivers, pipe systems, groundwater flow, and diffusion and dispersion in rivers.

304643 Hydropower Engineering**3(3-0-6)**

Hydrological and hydraulic analysis and design for hydropower projects; dams, hydraulic structures, and facilities for hydropower projects; and cost-benefit analysis for hydropower projects.

304644 Water Resource Project Management**3(3-0-6)**

Structure calibration, field monitoring of water use for land preparation, effective rainfall and return flow for rice and other crop cultivation in pilot areas, irrigation efficiency, irrigation demand models, weekly water schedule and system simulation modeling, application of the calculation of rule curves for the improvement of existing and new water source projects.

304645 Advanced pen Channel Hydraulics**3(3-0-6)**

Critical and uniform flows, gradually varied flows, sub-critical flows through constrictions, rapidly varied flows, hydraulic jump and energy dissipation of unsteady flows, and applications to practical problems.

304646 Selected Topics in Water Resource Engineering**3(2-2-5)**

Selected topics in water resource engineering currently of interest in the research and labour market fields, and presentation of a term paper.

304651 Numerical Methods in Geotechnical Engineering**3(3-0-6)**

Applications of numerical methods in flows through problematic porous media, consolidation theories and stability analysis, and the finite element method in geotechnical problems.

304652 Rock Mechanics**3(3-0-6)**

Rock formations, index properties and classifications, engineering properties, strength of jointed rock mass, factors influencing strength and modulus, foundations on rocks, stability of rock slopes, and introduction to rock tunneling.

304653 Geomechanics**3(3-0-6)**

Critical state strength of soil, stress-strain modeling based on critical state theory, behavior of soils before failure, and consolidation theories in one, two, and three dimensions.

304654 Geotechnical Engineering Design and Construction 3(2-2-5)

The application of geotechnical engineering principles to the design and construction of shallow foundations, deep pile foundations, sheet pile braced cut systems, and diaphragm walls.

304655 Reliability-Based Design for Geotechnical Engineering 3(2-2-5)

Probabilistic theory and random process in geotechnical engineering, FORM/SORM and Monte Carlo simulation, uncertainty of estimated engineering soil properties, reliability index, applications to foundation design, and levels of reliability.

304656 Selected Topics in Geotechnical Engineering 3(2-2-5)

Selected topics in geotechnical engineering currently of interest in the research and labour market fields and presentation of a term paper.

304681 Seminar 1 1(0-3-1)

Review and discussion of problems and progress in civil engineering.

304682 Seminar 2 1(0-3-1)

Discussion of special topics related to advanced civil engineering including the analysis of data, formulating conclusions, and report presentation.

304683 Seminar 3 1(0-3-1)

Discussion of special topics related to advanced civil engineering concerning research projects, the analysis of data, formulating conclusions, and report presentation.

304684 Dissertation 1, Option 1.1 3Credits

A literature review of basic knowledge and research relevant to the topic, exploration of the research direction for a proposed dissertation, and submission of a progress report to the program advisor.

304685 Dissertation 2, Option 1.1**9Credits**

A further literature review, intensive study of basic knowledge and research relevant to the topic, a feasibility study of the proposed dissertation research topic, development of guidelines and a research framework, and submission of a progress report to the program advisor.

304686 Dissertation 3, Option 1.1**9Credits**

Conducting an intensive study of the proposed research topic, developing the research hypotheses and methodology, and submitting a progress report to the program advisor.

304687 Dissertation 4, Option 1.1**9Credits**

Preparing a dissertation proposal, conducting the research following the defined methodology, and submitting a progress report to the program advisor.

304688 Dissertation 5, Option 1.1**9Credits**

Summarising the preliminary research results, preparing an article(s) suitable for publication in national or international journals, and submitting a progress report to the program advisor.

304689 Dissertation 6, Option 1.1**9Credits**

Summarising the research results, writing up the complete dissertation, preparing for and completing the dissertation defense, and submitting a completed dissertation to the graduate school.

304691 Dissertation 1, Option 2.1**3Credits**

Conducting a literature survey, reviewing basic knowledge and research relevant to the topic, exploring the direction for a dissertation research study, and submitting a progress report to the program advisor.

304692 Dissertation 2, Option 2.1**3Credits**

A feasibility study for a proposed dissertation research topic, conducting an intensive study of the selected research topic, developing a research framework and guidelines, and submitting a progress report to the program advisor.

304693 Dissertation 3, Option 2.1**3Credits**

Conducting an intensive study of the proposed research topic, developing the research hypotheses and methodology, and submitting a progress report to the program advisor.

304694 Dissertation 4, Option 2.1**9Credits**

Preparing a dissertation proposal, conducting research following the defined methodology, and submitting a progress report to the program advisor.

304695 Dissertation5, Option 2.1**9Credits**

Summarising the preliminary research results, preparing an articles(s) suitable for publication in national or international journals, and submitting a progress report to the program advisor.

304696 Dissertation 6, Option 2.1**9Credits**

Summarising the research results, writing up the complete dissertation, preparing for and completing the dissertation defense, and submitting a completed dissertation to the graduate school.