

### (Draft)

# Graduate Program in Civil Engineering School of Civil Engineering (Revised 2007)

Institute of Engineering Suranaree University of Technology

# UCO 2550 168 13 Curriculum

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#### Graduate Program in Civil Engineering School of Civil Engineering Institute of Engineering Suranaree University of Technology

#### 1. Program Titles

- 1.1 Master Program Master Program in Civil Engineering
- 1.2 Doctoral Program

Doctoral Program in Civil Engineering

#### 2. Degree Titles

2.1 Master Degree

Full Title	: Master of Engineering (Civil Engineering)
(Thai)	: วิศวกรรมศาสตรมหาบัณฑิต (วิศวกรรมโยธา)
Abbreviated Title	: M. Eng. (Civil Engineering)
(Thai)	: วศ.ม. (วิศวกรรมโยธา)

2.2 Doctoral DegreeFull Title(Thai)Abbreviated Title

(Thai)

: วิศวกรรมศาสตรดุษฎีบัณฑิต (วิศวกรรมโยธา) : Ph.D. (Civil Engineering) : วศ.ค. (วิศวกรรมโยธา)

: Doctor of Philosophy in Civil Engineering

#### 3. Responsible Department (Unit)

School of Civil Engineering, Institute of Engineering, Suranaree University of Technology.

#### 4. Philosophy and Objectives

By nature, civil engineering deals with public service, i.e., civil engineers design structures, plan land use, build roads, buildings and bridges, construct water reservoirs, handle water supply and wastewater treatment; all these functions are to ensure safety and comfort in our daily life. In a final analysis, civil engineers attempt to improve the quality of life for all citizens.

The fundamental objective of the graduate program in civil engineering at Suranaree University of Technology is to train graduate in advanced knowledge of civil engineering which will them to carry out independent and professional work or research. Additional objectives of the programs are (1) to extend the boundaries of knowledge

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through research for the betterment of society (2) to preserve, and transmit knowledge to successive generations.

Suranaree University of Technology offers the graduate program in civil engineering to produce master degree and doctoral degree graduates in order to fulfill the country's need. This graduate program is open to all qualified bachelor and master degree graduates in sciences or engineering. Engineering graduates will address the challenges that they will face in their careers, pursue life-long learning and continue to develop their problem-solving skills.

#### 5. Program Inception

Enrollment of the students in this program will begin in the first trimester of academic year 2007.

#### 6. Admission Requirements

The applicant' qualification follows those described in SUT's Regulation for Graduate Studies. The program welcomes all qualified applicants with a Bachelor or a master degree in engineering, or other related fields.

#### 7. Application Process

As stated in the SUT Regulation for Graduate Studies.

#### 8. Academic System

As stated in the SUT Regulation for Graduate Studies.

#### 9. Study Duration

As stated in the SUT Regulation for Graduate Studies.

#### 10. Registration

As stated in the SUT Regulation for Graduate Studies.

#### 11. Degree Requirement

#### Master degree

- The student must complete the required workload.
- The thesis must be approved by the School of Civil Engineering.
- Before defending the master thesis, the results of the research leading to the thesis must be published (or accepted for publication) in a national research journal or a national symposium.
- Other requirements as stated in the SUT Regulation for Graduate Studies.

#### Doctoral degree

- The student must complete the required workload.
- The thesis must be approved by the School of Civil Engineering.
- Before defending the doctoral thesis, a full paper which is a part of the thesis must be published (or accepted for publication) in an international journal indexed orlisted in a well recognized database that has been approved by the Institute of Engineering.
- Other requirement as stated in the SUT Regulation for Graduate Studies.

#### 12. Curriculum and Teaching Faculty

#### **12.1** Curiculum Faculty

Assoc. Prof. Dr. Amnat Apichatvullop

Ph.D. (WaterResources Planning), Colorado State University, U.S.A.

Assist. Prof. Dr. Mongkol Jiravacharadet Ph.D. (Civil Engineering), University of Tokyo, Japan

Assist. Prof. Dr. Suksun Horpibulsuk Ph.D. (Geotechnical Engineering), Saga University, Japan

Dr. Tanongsak Bisarnsin

Ph.D. (Civil Engineering), University of Texas at Arlington, U.S.A.

Dr. Avirut Chinkulkijniwat

D.Eng. (Civil Engineering), Graz University of Technology, Austria

#### 12.2 Teaching Faculty

Assoc. Prof. Dr. Sittichai Seangatith Ph.D. (Civil Engineering), University of Texas at Arlington, U.S.A.

Assist. Prof. Dr. Chatchai Jothiyangkoon Ph.D. (Environmental Engineering), University of Western Australia, Australia Dr. Pornpot Tanseng

Ph.D. (Gectechnical Engineering),

University of Innsbruck, Austria

Dr. Theerawat Sinsiri

Ph.D. (Civil Engineering),

King Mongkut's University of Technology Thonburi, Thailand

#### 13. Enrollments

For the first 5 years, the number of students enrolled in the program in each year is as follows

a a			Number exp	Number expected to		
<sup>*</sup> ''Academic	Number of admission		graduate in the academic year			
Year Master Doctoral		Master	Doctoral			
2007	5	2	-	-		
2008	5	2	5	-		
2009	7	2	5	2		
<sup>1</sup> <sup>1</sup> <sup>1</sup> 2010	7	2	7	2		
2011	10	2	7	2		

4. Location and Equipment

Location: Classrooms in the Center of Educational Services, Suranaree University of Technology

Equipment: Laboratory equipment from the Center for Scientific and Technology Equipments; and accessories for lecturing from the Center of Library and Education Media, Suranare University of Technology

#### 15. Library

The Center of Library Resources and Educational Media offers the following resources and services.

15.1 Resources

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5.1.1	Books			
	Thei	22,424	titles	
	English	68,616	titles	
5.1.2	Journals			
	Thai	142	titles	
	International	285	titles	
•	Received from Donation	995	titles	
5.1.3	Audio-visual and electronic	3,279	titles	

#### 15.2 Inter-library Loan

Offering loan/photocopying services from other Thai and foreign universities and other public institutions.

#### 15.3 Information Search Service

15.3.1 Search for items at CLREM

15.3.2 Search for items at other libraries

#### 15.4 Database

15.4.1 Database on CD-ROM

- Chemistry Citation Index from 1999

- ComputMath Citation Index from 1999

- Thai theses from B.E.2509

15.4.2 Database On-line

- IEEE/IEL -- Full text database of articles, journals, proceedings and standards in electrical and electronic engineering and other related fields

- DAO -- database of abstracts of master and Ph.D.thesis from U.S., Canada, etc. in all fields.

- Medline -- database in medicine, public health, nursing and medical sciences.

- FirstSearch over 80 databases covering all fields, e.g. sciences, technology, agriculture, medicine, etc.

- E-journal from American Chemical Society over 24 titles covering chemistry, biochemistry and biotechnology from 1996.

#### CLREM web: http://library.sut.ac.th

#### 16. Fiscal Budget

The School of Civil Engineering receives the annual budget from Suranaree University of Technology.

#### 17. Curriculum

The School of Civil Engineering offers graduate programs leading to advanced degrees in Civil Engineering with specialization in structural, geotechnical and water resources engineering. Details are as follows.

#### 17.1 Total Credits

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#### Master Degree Program

- Plan A Scheme A1: (Research and thesis) (minimum) 45 credits

- Plan A Scheme A2: (Instructional courses with thesis) (minimum) 45 credits Doctoral Degree Program

#### For Research and thesis

- Scheme 1.1: (Master degree holders) (minimum)

60 credits

#### For Instructional courses with thesis

- Scheme 2.1: (Master degree holders) (minimum)

- Scheme 2.2: (Bachelor degree holders) (minimum)

60 credits 90 credits

#### **17.2 Program Structure**

#### **Master Degree**

#### Plan A Scheme A1: Research and thesis

Students pursuing master degrees under this option are required to undertake master thesis with a minimum workload of 45 credits with no instructional courses. However, at the advice of the supervisors students may audit (attend as visitors) some courses deemed useful for their research. Students must demonstrate their ability to apply the knowledge to solve original research problems. This option is available for those who have work experience and strong academic background in relevant fields and ability to work independently.

#### Plan A Scheme A2: Instructional courses with thesis

Students pursuing master degrees under this option are required to undertake at least 25 credits of instructional courses and 20 credits of master thesis, distributed as follows:

core courses	5	credits
major courses	12	credits
electives (minimum)	8	credits and
master thesis (minimum)	20	credits

Conditional acceptance may be offered to some applicants under this scheme. These applicants will have to undertake some undergraduate courses deemed appropriate to strengthen their academic background.

#### **Doctoral Degree**

#### Scheme 1.1: Research and thesis

Students pursuing doctoral degrees under this option must be master degree holders. They are not required to undertake instructional course. However, at the advice of the supervisors students may audit some courses deemed useful for their research. Students must demonstrate their ability to apply the knowledge to solve original research problems. The minimum workload for the thesis is 60 credits.

This option is available for those who have strong academic background in relevant fields and ability to work independently.

#### Scheme 2: Instructional courses with thesis Scheme 2.1

Prospective students must be master degree holders of relevant fields. They are required to take at least 15 credits of coursework and 45 credits of thesis. The total load is distributed as follows:

core courses/major courses/electives doctoral thesis (minimum) 15 credits, and45 credits

#### Scheme 2.2

Bachelor degree holders admitted under this plan must have graduated with honors in relevant fields. Candidates are required to take minimum of 30 credits of coursework and 60 credits of thesis, distributed as follows:

core courses	6	credits
major courses	12	credits
electives (minimum)	12	credits and
doctoral thesis (minimum)	60	credits

To strengthen their knowledge and upon consultation with their advisors, students may wish to audit some undergraduate courses. Note that no undergraduate courses can be counted toward the above requirements for graduation.

#### 17.3 Civil Engineering courses by area of study

#### Core courses

43060 Introduction to Finite Element Method	4 (4-0-12)
430602 Graduate Seminar in Civil Engineering I	1 (0-3-4)
430603 Graduate Seminar in Civil Engineering II	1 (0-3-4)

# Major courses in Structural Engineering430620 Advanced Theory of Structures4 (4-0-12)430621 Dynamics of Structures4 (4-0-12)430622 Advanced Mechanics of Materials4 (4-0-12)

#### Major courses in Geotechnical Engineering

430640 Theoretical Soil Mechanics	4 (4-0-12)
430641 Advanced Foundation Engineering	4 (4-0-12)
430642 Ground Improvement Techniques	4 (4-0-12)

	Major courses in Water Resources Engineering	
	430660 Advanced Hydrology	4 (4-0-12)
	430661 Computational Hydraulics	4 (4-0-12)
	430662 Systems Analysis	4 (4-0-12)
	Electives	
	430610 Numerical Methods in Engineering	4 (4-0-12)
	430611 Statistics for Civil Engineering	4 (4-0-12)
	430612 Advanced Engineering Geology	4 (4-0-12)
	430613 Continuum Mechanics	4 (4-0-12)
•	430623 Advanced Matrix Method for Structures	4 (4-0-12)
	430624 Theory of Elastic Stability	4 (4-0-12)
	430625 Theory of Plates and Shells	4 (4-0-12)
	430626 Advanced Finite Element Method	4 (4-0-12)
	430627 Advanced Concrete Technology	4 (4-0-12)
	430628 Reinforced Concrete Structures	4 (4-0-12)
	430629 Advanced Prestressed Concrete	4 (4-0-12)
	430630 Masonry Structures	4 (4-0-12)
	430631 Steel Structures	4 (4-0-12)
	430632 Experimental Method in Civil Engineering	4 (3-3-9)
	430633 Wind Effects on Structures	4 (4-0-12)
	430634 Earthquake-Resistant Design	4 (4-0-12)
	430635 Structural Control	4 (4-0-12)
	430636 Mechanics of Composite Materials	4 (4-0-12)
	430637 Design of Advanced Composite in Civil Engineering Structures	4 (4-0-12)
	430638 Advanced Analytical Tools in Cement Based Materials	4 (4-0-12)
	430643 Laboratory, Field Testing, and Instrumentation in Geotechnical Engineering	4 (4-0-12)
	430644 Soil Dynamics	4 (4-0-12)
	430645 Geomechanics	4 (4-0-12)
	430646 Earth Structures	4 (4-0-12)
	430647 Rock Mechanics	4 (4-0-12)
	430648 Analytical Method in Geotechnical Engineering	4 (4-0-12)
	430649 Numerical Modeling for Geotechnical Engineering	4 (4-0-12)
	430650 Deep Excavation and Tunneling	4 (4-0-12)
	430651 Unsaturated Soil Mechanics	4 (4-0-12)
	430652 Geostatistics	4 (4-0-12)
	430663 Modeling of Hydrologic Processes	4 (4-0-12)
	430664 Water Resources Systems Analysis	4 (4-0-12)
	430665 River and Foodplain Management	4 (4-0-12)
	· · · · · · · · · · · · · · · · · · ·	

430666 River Engineering	4 (4-0-12)
430667 Statistical Methods in Hydrology	4 (4-0-12)
430668 Subsurface Hydrology	4 (4-0-12)
430711 Special Problems in Advanced CE I	4 (4-0-12)
430712 Special Problems in Advanced CE II	4 (4-0-12)
430713 Special Problems in Advanced CE III	4 (4-0-12)
430714 Special Problems in Advanced CE IV	4 (4-0-12)

#### Thesis

430891 Master Thesis I	(20 credits)
430892 Master Thesis II	(45 credits)
430893 Doctoral Thesis I	(60 credits)
430894 Doctoral Thesis II	(45 credits)
430895 Doctoral Thesis III	(60 credits)

Note: The 6-digit course number has the following meaning:

- The first digit represents the institute code, i.e., Institute of Engineering = 4.
- The second and third digits are the department code, i.e., School of Civil Engineering = 30.
- The fourth digit indicates the study levels, i.e., 5 = advanced undergraduate course, graduate course = 6-8.
- The fifth digits show specific meaning as follows: 0 = core courses, 9 = thesis.
- The sixth digit shows the order of the course.

#### 17.4 Study Plan

#### Plan A Scheme A1: Research and thesis

y Year	Trimester a di	Ċŕ	A 2 <sup>nd</sup> Trimester 5 19 4	Ċř	Bro Trimesters 1	CCF .
	430892 Master Thesis II	3	430892 Master Thesis II	3	430892 Master Thesis II	9
. 1.	Total	<b>デビン</b> 1135	Total	13 13	Total	<b>1</b> 9
•	430892 Master Thesis I	10	430892 Master Thesis II	10	430892 Master Thesis II	10
2	Total	510	of the Total	10	Total -	101

#### **Total 45 credits**

Year	-1. cl Trimestern	Ē.	2 <sup>nd</sup> firimester	Cr.	3 <sup>rd</sup> Trimester LE+	·Gr.
•	430601 Introduction to Finite Element Method	4	430602 Graduate Seminar in Civil Engineering I	1	430891 Master Thesis I	3
. 1	Major courses (1)	4	Major courses (3)	4	Electives (2)	4
	Major courses (2)	4	Electives (1)	4		
2	Total	12	Total	-1 		
2	430891 Master Thesis I	3 2010	430891 Master Thesis I	7	430891 Master Thesis I	7 7

Plan A Scheme A2: Instructional courses with thesis

**Total 45 credits** 

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#### Scheme 1.1: Research and thesis

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For master degree holders						
Year State	r Ust Unimester	Gr.	2nd Trimester		S. Ord Trimester C.	C.
1	430893 Doctoral Thesis I	3	430893 Doctoral Thesis I	3	430893 Doctoral Thesis I	3
·	and a thotal second		NAL IIOtalise ;	<b>3</b> 34	A Star ALOIAL STAR	33
			- 			
· .	430893 Doctoral	8	430893 Doctoral	8	430893 Doctoral	8
2 ·	Thesis I		Thesis I		Thesis I	
. •	Total	8	(Totalt ST	18	oc. P/s Total co	8.
		,	ч Ч			
	430893 Doctoral	8	430893 Doctoral	8	430893 Doctoral	11
3	Thesis I		i hesis i			
	Totals a	813	· Total	84	Totals 33	211

Total 60 credits

#### Scheme 2.1: Instructional courses with thesis

For master degree holders

\$

For master degree holders						
.Year	2. All Trimester S	iCr3	21 Trimester	i Ci	3rt Trimester.	Cra
	Core courses/Major courses/Electives (1)	4	Core courses/Major courses/Electives (3)	4	430894 Doctoral Thesis II	3
1	Core courses/Major courses/Electives (2)	4	Core courses/Major courses/Electives (4)	3		
	Total State	584	Total States	275	A Total State	31
2	430894 Doctoral Thesis II	3	430894 Doctoral <sup>*</sup> Thesis II	3	430894 Doctoral Thesis II	9
	Total Star	132	Total 4	38	Total Statis	- 913
3	430894 Doctoral Thesis II	9	430894 Doctoral Thesis II	9	430894 Doctoral Thesis II	9
	Total i al a	192	Total 12	¥9	Service Total And Arts	39£

Total 60 credits

### Scheme 2.2: Instructional courses with thesis

.

For bachelor degree holders

Year	21. Trimester	ALC:	1. 12 nd Trimester 15	FCF.	3 Trimester, 31	Cr.
	430601 Introduction to Finite Element Method	4	430602 Graduate Seminarin Civil Engineering I	1	430603 Graduate Seminar in Civil Engineering []	1
1	Major courses (1)	4	Major courses (3)	4	Electives (2)	4
	Major courses (2)	4 .	Electives (1)	4	Electives (3)	4
	A Total of Street	\$123	Total States	\$93	a stational and a station	19.1
2	430395 Doctoral Thesis Ⅲ	3	430895 Doctoral Thesis III	3	430895 Doctoral Thesis III	3
	Total	\$ 3 3	No. Notation	3.	Ger al Total A	231
3	430895 Doctoral Thesis III	9	430895 Doctoral Thesis III	. 9	430895 Doctoral Thesis III	9
	Totalice H	<b>6</b> 91	I to a Total How	2 <b>9</b> 3	Sarat Total 222 5.	<b>3</b> 9
- 4	430895 Doctoral Thesis III	9	430895 Doctoral Thesis III	9	430895 Doctoral Thesis III	6
	Total 12	<b>光</b> 9世	Total	*94	Total Astron	× 6 1

Total 90 credits

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#### 17.5 Course Description

#### 430601 Introduction to Finite Element Method

Condition: Consent of the School

Introduction to finite element method (FEM), boundary and initial conditions, discretization of the domain, interpolation models, derivation of element matrices, assembly of element matrices and derivation of system equations; numerical solution of finite element equations; application to solid mechanics problems; modeling considerations and software use.

#### Course Outline

1.	Overview of finite element method (FEM)	(4 hours)
2.	Review of matrix algebra and solution of simultaneous linear equations,	(4 hours)
	Review of variational calculus	
3.	Boundary and initial Conditions - Discretization of the domain	(4 hours)
4.	Interpolation models	(4 hours)
5.	Direct stiffness method	(4 hours)
6.	FEM for structures: Bars and beams	(4 hours)
7:	FEM for structures: Trusses	(4 hours)
8.	FEM for structures: Frames and grids	(4 hours)
9.	Plane stress and plane strain problems	(8 hours)
10.	Modeling considerations and software use	(8 hours)

# 430602Graduate Seminar in Civil Engineering I1 (0-3-4)Condition: Consent of the School

This course is meant to expose all incoming graduate students to possible areas, topics, and methods of research in Civil Engineering. The students are required to present and discuss academic articles related to their research.

#### 430603 Graduate Seminar in Civil Engineering II 1 (0-3-4)

Condition: Consent of the School

Introduction to research methodology, literature survey, discussion and criticism on academic articles, summary and conclusion, presentation of research results, academic writing, multimedia preparation, oral presentation. The students are required to develop a preliminary thesis proposal, by writing a technical report and presenting their work.

#### 430610 Numerical Methods in Engineering

#### 4 (4-0-12)

Condition: Consent of the School

Introduction to computer software for solving Civil Engineering problems; numerical methods and applications in Civil Engineering problems.

2.	Introduction to computer software	(4 hours)
3.	Approximations and errors	(8 hours)
4.	Roots of equations	(8 hours)
5.	Systems of linear algebraic equations	(4 hours)
б.	Curve fitting	(4 hours)
7.	Numerical integration	(4 hours)
8.	Ordinary differential equations	(4 hours)
9.	Finite difference: elliptic equations	(4 hours)
10	Firite-element method	(8 hours)

#### 4 (4-0-12)

Condition: Consent of the School

430611 Statistics for Civil Engineering

Introduction to the elements of probability and statistics relevant to the reliabilitybased design in civil engineering, the concept of system reliability and reliability analysis, ard the techniques used to analyze the testing pattern and data.

#### **Course Outline**

1.	Prebability	(4 hours)
2.	Statistics for reliability analysis	(4 hours)
3.	Regression and correlation	(4 hours)
4.	System reliability	(4 hours)
5	Combinatorial reliability	(4 hours)
5	Reliability of civil engineering system	(4 hours)
7.	Reliability analysis	(4 hours)
8.	Point estimate method	(4 hours)
9.	Generalized point estimate method	(4 hours)
10.	Gaining information	(4 hours)
11.	Risk analysis	(8 hours)

#### 430612 Advanced Engineering Geology

Condition: Consent of the School

Rock minerals; geological characteristic; soil formation; geologic map; rock classification; electric log and radioactive log; geologic hazards.

#### Course Outline

- 1. Minerals, Identification of rocks, Laterite versus sapolite, Residual soil terminology
- 2. Alluvial fan deposits, Cross-bedding directions in a barchan dune and a seif dune in relation to wind direction, Five major classes of dolines, Glaciated terrain

(4 hours)

(4 hours)

4 (4-0-12)

3.	Rock and soil symbols, Rock clauses, Soil classification, The activity of soil	(4 hours)
4.	Topographic maps, Geologic maps, Orientation and study of aerial	
	photographs, Geologic time scale	(4 hours)
5.	Wulff net, Schmidt's net, and Kalsbeek net	(4 hours)
6.	Test categories for standardization, Physical properties of rocks	(4 hours)
7.	Average seismic velocity of some earth materials, Ripper performance	
	estimated by seismic wave velocity, Qualitative interpretation of conventional	
	electric logs, Radioactive logs	(4 hours)
8.	Quantitative description of rock mass, Engineering classification of intact,	
	Geomechanics classification of jointed rock masses, Geomechanics rock,	
	classification guide for excavation and support in rock tunnels,	(4 hours)
9.	Geologic hazards	(8 hours)

#### 430613 Continuum Mechanics

4 (4-0-12)

**Condition:** Consent of the School

Study of the underlying physical and mathematical principles relating to the behavior of continuous media, emphasizing in solid mechanics, the foundations of the general nonlinear theories of continuum mechanics, the general treatment of motion and deformation of continua, balance laws, and constitutive theory, particular applications to elastic solids and simple materials.

#### **Course Outline**

1.	Vectors and tensors	(4 hours)
2.	Stress	(4 hours)
3.	Principal stresses and principal axes	(4 hours)
4.	Analysis of strain and deformation	(8 hours)
5.	Compatibility conditions	(4 hours)
6.	Constitutive equations	(4 hours)
7.	Isotropy	(8 hours)
8.	Mechanical properties of solids	(4 hours)
9.	Some simple problems in elasticity	(8 hours)

#### 430620 Advanced Theory of Structures

Condition: Consent of the School

Work done by loads and strain energy; energy theorems; direct approach to formulation of bar; beam of indeterminate structures; large displacement; stability of structure; formulation of geometrically nonlinear problems; formulation of inelastic problems; numerical methods for nonlinear structural analysis.

4 (4-0-12)

1.	Introduction to structural analysis	(4 hours)
2.	Energy theorem	(4 hours)
3.	Application of strain energy	(4 hours)
4.	Structural fundamental	(4 hours)
5.	Derivation of structural matrices	(4 hours)
6.	Structural matrices	(4 hours)
7.	Generalized structural system	(4 hours)
8.	Introduction to nonlinear analysis	(4 hours)
9.	Large displacement analysis	(4 hours)
10	. Material nonlinearity	(4 hours)
11.	Numerical methods for nonlinear, structural analysis	(8 hours)

#### 430621 Dynamics of Structures

4 (4-0-12)

Condition: Consent of the School

Fundamental of structural dynamics analysis; types of dynamics loadings on structures, methods in formulation of equations of motion which indicates the dynamics behavior of structures; the lump mass model of structures; single-degree-of-freedom systems; multi-degree-of-freedom systems; formulation of the equations of motion of these system as well as their response under various kinds of loading.

#### Course Outline

1.	Overview of structural dynamics	(4 hours)
2.	Formulation of the equation of motion	(4 hours)
3.	Single-degree-of-freedom(SDOF) systems	(4 hours)
4.	Responses of SDOF systems	(8 hours)
5.	Multi-degree-of-freedom(MDOF) systems	(4 hours)
6.	Responses of MDOF systems	(4 hours)
7.	Responses by the transition matrix	(4 hours)
8.	Stability of the dynamics systems	(4 hours)
9.	Eigensolution of the dynamic systems	(4 hours)
10.	Modal analysis of the response	(4 hours)
11.	Analysis of nonlinear systems	(4 hours)

#### 430622 Advanced Mechanics of Materials

4 (4-0-12)

Prerequisite: 430211 Mechanics of Materials or Consent of the School

Analysis of stresses and strains at a point; stress-strain relations for various types of materials; theory of elasticity and energy methods used to analyze structural members; static failure and failure criteria used to predict a failure of structural members; fatigue analysis; introduction to fracture mechanics; beams on elastic foundation; plate bending; buckling and instability of plate.

1.	Theories of stress and strain	(4 hours)
2.	Stress-strain relations	(4 hours)
3.	Elements of theory of elasticity	(8 hours)
4.	Applications of energy methods	(8 hours)
5.	Static failure and failure criteria	(4 hours)
6.	Fatigue	(4 hours)
7.	Introduction to fracture mechanics	(4 hours)
8.	Beams on elastic foundation	(4 hours)
9.	Plate bending	(4 hours)
10	. Buckling and instability	(4 hours)

#### 430623 Advanced Matrix Method for Structures

4 (4-0-12)

Condition: Consent of the School

Matrices and computers in the analysis of structures; force and displacement methods; direct stiffness, and energy formulation; applications to plane and space trusses, multi-span gable frames, grid and space frames, multistory building frames; partitioning by use of substructures.

#### **Course Outline**

1.	Structural theorems	(4 hours)
2.	Force method	(4 hours)
3.	Displacement method	(4 hours)
4.	Derivation of stiffness matrices	(4 hours)
5.	Stiffness matrices	(4 hours)
6.	Analysis of structures in 2D	(4 hours)
7.	Analysis of structures in 3D	(4 hours)
8.	Irregular boundary conditions	(4 hours)
9.	Irregular loading conditions	(4 hours)
10	Analysis of substructures	(8 hours)
11.	Structural systems	(4 hours)

#### 430624 Theory of Elastic Stability

4 (4-0-12)

Condition: Consent of the School

The analysis of beam-column, elastic buckling, inelastic buckling, and experiments on buckling of bars, torsional buckling and lateral buckling of beams, bending and buckling of thin plates.

1.	Beam-columns	(8 hours)
2.	Elastic buckling of bars	(4 hours)
3.	Elastic buckling of frames	(4 hours)
4.	Inelastic buckling of bars	(4 hours)
5.	Experiments and design formulas	(4 hours)
6.	Torsional buckling	(4 hours)
7.	Lateral buckling of beams	(4 hours)
8.	Bending of thin plates	(8 hours)
9.	Buckling of thin plates	(8 hours)

#### 4 (4-0-12)

4 (4-0-12)

#### Condition: Consent of the School

430625 Theory of Plates and Shells

Basic equations for the bending of rectangular, circular, and continuous plates; anisotropic rectangular plate with various edge conditions; general theory of deformation of thin shells with small deflections, effect of edge conditions; analysis of shell structures; cylindrical vaults, domes, double curved roofs, and tanks; Numerical and approximate methods for plate and shell analyses.

#### Course Outline

1.	Pure bending of long rectangular plates	(4 hours)
2.	Small deflections of laterally loaded plates	(4 hours)
3.	Simply supported rectangular plates	(4 hours)
4.	Rectangular plates with various edge conditions	(4 hours)
5.	Circular plates	(4 hours)
6.	Continuous rectangular plates	(4 hours)
7.	Anisotropic rectangular plates	(8 hours)
· <b>8</b> .	Deformation of shells without bending	(4 hours)
9.	General theory of cylindrical shells	(4 hours)
10	. Numerical methods for plate and shell analysis	(8 hours)

#### 430626 Advanced Finite Element Method

Condition: Consent of the School

Finite element method, numerical method and computer in the analysis of structures; direct and generalized formulation of the approximate analysis with applications to bar, beam, plane strain and plane stress, axi-symmetric and general solid elements, and the modeling of structural systems.

627 Advanced Concrete Technology	4 (4-0-12)
Analysis tool and implementation	(4 hours)
Creep	(4 hours)
. Plasticity	(4 hours)
Material nonlinearity	(4 hours)
Large strain	(4 hours)
Large displacement	(4 hours)
Formulation of structural system	(4 hours)
Derivation of element matrices	(4 hours)
Derivation of 1	(4 hours)
Stress and strain in elements	(4 hours)
Structural theorems	(4 hours)
Introduction to finite element method	(4 hours)
-	Introduction to finite element method Structural theorems Stress and strain in elements Isoparametric formulation Derivation of element matrices Formulation of structural system Large displacement Large strain Material nonlinearity Plasticity Creep Analysis tool and implementation 627 Advanced Concrete Technology

Condition: Consent of the School

Review of concrete technology; pozzolanic materials; special concrete; durability of concrete; microstructure of concrete; advanced analytical tools for concrete.

#### **Course Outline**

1.	Review of concrete technology	(8 hours)
2.	Pozzolanic materials in concrete	(8 hours)
3.	Special concrete	(8 hours)
4.	Durability of concrete	(8 hours)
5.	Microstructure of concrete	(8 hours)
6.	Advanced analytical tools for concrete	(8 hours)

#### 430628 Reinforced Concrete Structures

4 (4-0-12)

Condition: Consent of the School

Design of structural components such as beams, columns, slabs, footings and walls using the ultimate strength method; building code requirements for reinforced concrete; truss models for shear and torsion, development and anchorage.

#### Course Outline

1.	Overview of concrete structures, Design methods and requirements	(4 hours)
2.	Strength of structural members in bending	(4 hours)
3.	Shear strength and shear reinforcement	(4 hours)
4.	Beams in torsion	(4 hours)
5.	Serviceability of beams	(4 hours)
6.	Combined compression and bending: Columns	(4 hours)
7.	Development of reinforcement	(4 hours)

8.	Two-way slabs, plates, and continuous reinforced concrete structures	(4 hours)
9.	Structural stability	(4 hours)
10.	Length effects on columns	(4 hours)
11.	Design of footings	(4 hours)
12.	Design of footings	(4 hours)

#### 430629 Advanced Prestressed Concrete

#### Condition: Consent of the School

Discussions concerning materials and methods used in prestressing; design of sections for flexure, shear, anchorage, and torsion; camber, deflections and cable layouts, simple spans, continuous beams, and prestressed tanks.

#### **Course Outline**

1.	Overview of prestressed concrete, Materials and structural behavior	(4 hours)
2.	Prestressing systems, End anchorages	(4 hours)
3.	Loss of prestress	(4 hours)
4.	Analysis of section in flexure	(4 hours)
5.	Design of section for flexure	(4 hours)
6.	Shear, Bond and Bearing	(4 hours)
7.	Post-tensioned slab, Computer applications	(4 hours)
8.	Torsion design	(4 hours)
9.	Camber, Deflection	(4 hours)
10.	Composite construction	(4 hours)
11.	Continuous beams	(4 hours)
12.	Tension members, Circular prestressing	(4 hours)

#### . 430630 Masonry Structures

#### 4 (4-0-12)

4 (4-0-12)

Condition: Consent of the School

Masonry unit types and grades, mortar types, reinforcement and connectors, beam, column, arch, bearing wall design; structural behavior and recommended standard construction practices; Plain and reinforced masonry, design parameter establishment, and recommended practice documents.

#### Course Outline

1.	Overview of masonry structures, Modern masonry construction	(4 hours)
2.	Clay brick and tile-material properties, Material and testing	(4 hours)
3.	Concrete masonry units, Material properties, Material and testing	(4 hours)
4.	Mortar, grout, and steel reinforcement, Materials and testing	(4 hours)
5.	Design parameter establishment	(4 hours)
6.	Load types and intensities, Loads and load combinations	(4 hours)
<sup>.</sup> 7.	Design philosophy and methodology, Structural analysis and design	(4 hours)

8.	Structural considerations for masonry walls, Load bearing walls,	
	Shear walls	(4 hours)
9.	Masonry columns and pilasters	(4 hours)
10.	Structural considerations for masonry beams, Bending behavior,	
	Design of reinforced concrete beams	(4 hours)
11.	Structural considerations for masonry beam-columns, behavior and design	(4 hours)
12.	Connections, joints, and construction details in practice	(4 hours)

#### 430631 Steel Structures

4 (4-0-12)

4 (3-3-9)

Condition: Consent of the School

Behavior of steel structures under load; topics include beams, columns, building connections, structural stability and bracing requirements; building codes and related documents.

#### Course Outline

1.	Overview of steel structures, design methods and requirements,	
	ASD and LRFD	(4 hours)
2.	Tension member behavior and design	(4 hours)
3.	Compression member behavior and design	(4 hours)
4.	Beam behavior under load and bracing requirements	(4 hours)
5.	Beam design	(4 hours)
6.	Torsional design of beam	(4 hours)
7.	Beam-columns behavior and design	(4 hours)
8.	Building types and connections	(4 hours)
<u>9</u> .	Bolted connection	(4 hours)
10.	Welded connection	(4 hours)
11.	Bracing requirements for compression members	(4 hours)
12.	Frame stability and bracing requirements	(4 hours)

#### 430632 Experimental Method in Civil Engineering

Condition: Consent of the School

Principles and techniques of measurements in mechanics; electrical-resistance strain gauges, semiconductor sensors, recording instruments, optical interference methods, photoelasticity, and dynamic measurements.

#### Course Outline

1.	Standards of measurement	(4 hours)
2.	Treatment of uncertainties '	(4 hours)
3.	Introduction to strain measurements	(4 hours)
4.	Electric resistance strain gages	(4 hours)
5.	Semiconductor sensors	(4 hours)

6.	Recording instruments	(4 hours)
7.	Aralysis of strain-gage data	(4 hours)
8.	Displacement measurements	(4 hours)
9.	Measurement of force and torque	(4 hours)
10.	. Measurement of motion	(4 hours)
11	. Photoelasticity	(4 hours)

#### 430633 Wind Effects on Structures

Condition: Consent of the School

Effects of wind loading on civil engineering structures; atmospheric circulation of wind: fundamental of force induced by bluff-body aerodynamics; applications to design problems.

#### **Course Outline**

1.	Atmosphere wind	(4 hours)
2.	Buff-body aerodynamics	(4 hours)
3.	Structural dynamics	(4 hours)
4.	Wind-induced vibration	(4 hours)
5.	Wind directionality effects	(4 hours)
6.	Tall buildings: Structural response and cladding design	(4 hours)
7.	Slender towers and stacks with circular cross section	(4 hours)
8.	Hyperbolic cooling towers	(4 hours)
9.	Trussed frameworks and plate girders	(4 hours)
10	. Suspended-span bridges, tension structures, and power lines	(4 hours)
11	. Offshore structures	(4 hours)
12.	. Wind-induced discomfort in and around buildings	(4 hours)

#### 430634 Earthquake-Resistant Design

4 (4-0-12)

4 (4-0-12)

Condition: Consent of the School

Effects of earthquake loading on civil engineering structures; characteristic of earthquake; effect of earthquake loading on structures; applications to design problems.

#### Course Outline

1.	Seismological background	(4 hours)
2.	Earthquake input mechanisms	(4 hours)
3.	Earthquake response of single-degree-of-freedom	(4 hours)
4.	Earthquake analysis of multi-degree-of-freedom	(4 hours)
5.	Earthquake response of linearly elastic buildings	(4 hours)
6.	Earthquake response of inelastic buildings	(4 hours)
7.	Earthquake dynamics of base-isolated buildings	(4 hours)
8.	Excitation by rigid-base rotation, Multiple-support excitation	(4 hours)

9.	Soil-structure interaction	(4 hours)
10.	Nonlinear response to earthquakes	(4 hours)
11.	Stochastic modeling of strong ground motions	(4 hours)
12.	Structural dynamics in building codes	(4 hours)

#### 430635 Structural Control

4 (4-0-12)

Prerequisite: 430621 Dynamics of Structures or Consent of the School

Introduction of vibration problem in structures; basic concepts of linear system and stability; discussion about how to control structures passively and actively; semi-active control.

#### **Course Outline**

1.	Introduction	(4 hours)
2.	Linear Systems	(4 hours)
3.	Stability analysis	(4 hours)
4.	Passive control	(4 hours)
5.	Active control	(4 hours)
6.	Classical control theory	(4 hours)
7.	Optimal control theory	(4 hours)
8.	Output feedback control	(4 hours)
9.	Nonlinear control	(4 hours)
10.	Control of buildings	(4 hours)
11.	Decentralized control of large scale system	(4 hours)
12.	Semi-active control	(4 hours)

#### 430636 Mechanics of Composite Materials

#### 4 (4-0-12)

Prerequisite: 430622 Advanced Mechanics of Materials or Consent of the School

Introduction to fiber-reinforced composite material; linear elastic stress-strain characteristics of fiber-reinforced composite materials; prediction of engineering properties using micromechanics; plane-stress assumptions; plane-stress stress-strain relation in a global coordinate system; classical lamination theory; failure theories for fiber-reinforced composite materials; introduction to fiber-reinforced laminated plates.

#### **Course Outline**

1.	Introduction to fiber-reinforced composite materials	(4 hours)
2.	Linear elastic stress-strain characteristics of fiber-reinforced	
	composite materials	(4 hours)
3.	Prediction of engineering properties using micromechanics	(4 hours)
4.	Plane-stress assumptions	(4 hours)
5.	Plane-stress stress-strain relation in a global coordinate system	(4 hours)
6.	Classical lamination theory: Kirchhoff hypothesis	(4 hours)

7.	Classical lamination theory: Laminate stiffness matrix	(4 hours)
8.	Classical lamination theory: Additional examples	(4 hours)
9.	Failure theories for fiber-reinforced composite materials I	(4 hours)
10	Failure theories for fiber-reinforced composite materials II	(4 hours)
11	Introduction to fiber-reinforced laminated plates I	(4 hours)
12	Introduction to fiber-reinforced laminated plates II	(4 hours)

430637 Design of Advanced Composites in Civil Engineering Structures 4 (4-0-12) Condition: Consent of the School

Design of fiber-reinforced plastic composites (FRP) of civil engineering structures; pertinent fundamental understanding of the constituents; manufacturing processes, and mechanical properties of the fiber reinforced plastic composite materials; the structural behavior and analysis; the design methodology for tension members, compression members, flexural members, and connection.

#### **Course Outline**

1.	Introduction to fiber-reinforced plastic composite	(4 hours)
2.	Manufacturing techniques	(4 hours)
3.	Macro mechanical behavior	(4 hours)
4.	Standard tests	(4 hours)
5.	Micromechanical behavior	(8 hours)
6.	Structural analysis	(8 hours)
7.	Member selection – manual	(4 hours)
8.	Design of compression members	(4 hours)
<u>9</u> .	Design of flexural members	(4 hours)
10	. Design of connections	(4 hours)

# 430638Advanced Analytical Tools in Cement Based Materials4 (4-0-12)Prerequisite: Consent of the School

Review of advanced xement based materials technology and analytical tools in cement based materials; microstructure of hydration reaction and pozzolanic reaction X-ray diffraction (XRD); thermal analysis (DTA, TGA and DSA) and electron microscope (SEM, BSEM, TEM, EDAX); porosity and pore size distribution of cement based materials; surface area with nitrogen adsorption technique (BET Method) synchrotron radiation technique.

#### Course Outline

- 1. Review of Advanced Concrete Technology and Analytical Tools in
  - Cement Based Materials

2. Solid Phase Analysis by X-Ray Diffraction (XRD)

(8 hours) (8 hours)

- Electron Microscopy with Various Techniques (SEM, BSEM, TEM, X-Ray Chemical Analysis (EDAX))
   (8 hours)
- Thermal Analysis (Differential Thermal analysis (DTA), Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC))
- Porosity, Pore Size Distribution and Surface Area (Mercury Intrusion Porosimeter (MIP) and Nitrogen Adsorption)
   (8 hours)
- 5. Application of Synchrotron Radiation Technique in Cement Based Materials (8 hours)

#### 430640 Theoretical Soil Mechanics

4 (4-0-12)

(8 hours)

Condition: Consent of the School

Physical properties; soils classification; ground water; coefficient of permeability; seepage; excess pore water pressure; effective stress; consolidation; strength and deformations.

#### Course Outline

1.	Soil formation and soil constituents	(4 hours)
2.	Soil mineral and soil-water interaction	(4 hours)
3.	Index properties and soil classification	(4 hours)
4.	Soil fabric and its measurement	(4 hours)
5.	Effective, intergranular and total stress	(4 hours)
6.	Soil structure	(4 hours)
7	Engineering properties of desturctured clays and their assessment	(8 hours)
8.	Engineering properties of structured clays and their assessment	(8 hours)

#### 430641 Advanced Foundation Engineering

4 (4-0-12)

Condition: Consent of the School

Site investigation; evaluation of geotechnical parameters; shallow foundation; instrumentation for pile and evaluation of instrumented pile load test results; improvement of bored pile capacity by toe/shaft grouting, earth pressure theories and retaining structures, instrumentation for deep excavation, observational method for design and construction of retaining structures.

#### **Course Outline**

- 1. Review of some essential soil mechanics and foundation engineering (4 hours)
- 2. Site investigation, Evaluation of geotechnical parameters, Geotechnical report(4 hours)
- Shallow foundation-combined footings, Mat foundation,
   Compensated foundation (8 hours)
- 4. Instrumentation for pile subjected to axial or lateral loading (4 hours)
- Evaluation of instrumented pile load test results for advanced pile
   design: Axial or lateral loading
   (4 hours)

6. Improvement of bored pile capacity by toe/shaft grouting	(4 hours)	
7. Earth pressure theories and retaining structures, Sheet pile wall,		
Diaphragm wall, Conventional/top-down construction	(8 hours)	
8. Instrumentation planning, Evaluation of monitored results,		
· . Evaluation of bracing and wall performance for deep excavation	(8 hours)	
9. Observational method for design and construction of retaining structures	s (4 hours)	
· · · · · · · · · · · · · · · · · · ·		
430642 Ground Improvement Techniques	4 (4-0-12)	
Prerequisite: 430640 Theoretical Soil Mechanics or Consent of the School		
Compaction; stone columns; vertical drains; preloading; chemica	l stabilization:	
	,	
reinforced earth.	<b>,</b>	
reinforced earth. Course Outline	· · ·	
reinforced earth. Course Outline 1. Principle of ground improvement	(4 hours)	
<ul> <li>reinforced earth.</li> <li>Course Outline <ol> <li>Principle of ground improvement</li> <li>Physical improvement methods : Compaction, Dewatering, Densification</li> </ol> </li> </ul>	(4 hours) n (8 hours)	
<ul> <li>reinforced earth.</li> <li>Course Outline <ol> <li>Principle of ground improvement</li> <li>Physical improvement methods : Compaction, Dewatering, Densification</li> <li>Chemical improvement methods</li> </ol> </li> </ul>	(4 hours) n (8 hours) (8 hours)	
<ul> <li>reinforced earth.</li> <li>Course Outline <ol> <li>Principle of ground improvement</li> <li>Physical improvement methods : Compaction, Dewatering, Densification</li> <li>Chemical improvement methods</li> <li>Earth reinforcement</li> </ol> </li> </ul>	(4 hours) n (8 hours) (8 hours) (8 hours)	

430643 Laboratory, Field Testing, and Instrumentation in Geotechnical Engineering 4 (3-3-9) Condition: Consent of the School

Physical properties; electronic instruments in laboratory; chemical tests; field permeability test; consolidation test; shear strength determination; field tests; instrumentation.

#### **Course Outline**

1.	Physical properties	(4 hours)
2.	Scanning electron microscope	(4 hours)
·3.	X-ray diffraction	(4 hours)
4.	Pore size distribution analysis	(4 hours)
5.	Field permeability test	(4 hours)
6.	Consolidation tests	(8 hours)
7.	Shear strength tests	(8 hours)
8.	Instrumentation	(8 hours)
9.	Field trip	(4 hours)

#### 430644 Soil Dynamics

4 (4-0-12)

Prerequisite: 430640 Theoretical Soil Mechanics or Consent of the School

Elasticity; visco-elasticity; soil stiffness; soil damping; soil liquefaction; site characterization; in-situ testing; laboratory testing; seismic response analysis; soil sampling; flow failure.

1.	Characteristics of dynamic problems	(4 hours)
2.	Characteristic changes in cyclic stress in typical dynamic loading	(4 hours)
3.	The presentation of stress-strain relations in cyclic loading	(4 hours)
4.	Apparatus and procedures for laboratory tests	(4 hours)
5.	In-situ survey by wave propagation	(4 hours)
6.	Low-amplitude shear moduli	(4 hours)
7.	Effect of loading speed and stiffness degradation of cohesionless soils	(8 hours)
8.	Strength of cohesive soils under transient and cyclic loading conditions	(4 hours)
9.	Resistance of sard to cyclic loading	(4 hours)
10.	Sand behavior under monotonic loading	(4 hours)
11.	Analysis of liquefaction	(4 hours)

#### 430645 Geomechanics

4 (4-0-12)

4 (4-0-12)

Prerequisite: 430640 Theoretical Soil Mechanics or Consent of the School

Basic concepts; critical state strength of soil; stress-strain modeling based on critical state theory; behavior of soils before failure.

#### Course Outline

1.	Basic concepts		(4 hours)
2.	Critical state theory	•	(8 hours)
3.	Stress-strain modeling		(8 hours)
4.	Behavior of soils before failure		(4 hours)
5.	Soil parameters for design		(8 hours)
6.	Koiter's equation and slip line fields		(8 hours)

#### 430646 Earth Structures

Prerequisite: 430640 Theoretical Soil Mechanics or Consent of the School

State of stress in ground; compacted soil; seepage problems and control methods; slope stability calculations; earth dam design.

#### **Course Outline**

1.	Natural Soils	(8 hours)
2.	Properties and applications of compacted soil	(8 hours)
3.	Seepage	(8 hours)
4.	Slope stability	(8 hours)
5.	Earth dam design	(4 hours)
6.	Field monitoring	(8 hours)

#### 430647 Rock Mechanics

Condition: Consent of the School

Index properties and classification; engineering properties; strength of jointed rock masses; factors influencing strength and modulus; foundation on rocks and rock slope.

#### **Course Outline**

1.	Index properties and classification	(4 hours)
2.	Engineering properties of soils and rocks	(8 hours)
3.	Rock fracture and failure criteria	(4 hours)
4.	Deformability	(4 hours)
5.	Creep and moisture sensitive properties	(4 hours)
6.	Shear strength of rock discontinuities	(8 hours)
7.	Foundations on rocks	(8 hours)
8.	Rock slope	(8 hours)

#### 430643 Analytical Methods in Geotechnical Engineering

4 (4-0-12)

Prerequisite: 430645 Geomechanics or Consent of the School

Analytical and numerical methods in geotechnical engineering; modeling the stress-strain behavior of soils (elastic models, rigid-perfectly plastic models, elasto-plastic models); analytical methods for ultimate limit state; upper and lower bound theorems; upper and lower bound methods for undrained analysis; upper and lower bound methods for drained analysis; application of upper and lower bound methods; method of characteristics; constructing a characteristic mesh for undrained loading; constructing a characteristic mesh for undrained loading; constructing a characteristic mesh for undrained loading; the limit equilibrium method.

#### Course Outline

1:	Analytical and numerical methods in geotechnical engineering	(4 hours)
2.	Modeling the stress-strain behavior of soils	(8 hours)
3.	Analytical methods for ultimate limit state	(4 hours)
4.	Upper and lower bound methods for undrained analysis	(8 hours)
5.	Upper and lower bound methods for drained analysis	(8 hours)
6.	Constructing a characteristic mesh	(8 hours)
7.	Limit equilibrium method	(8 hours)

#### 430649 Numerical Modeling for Geotechnical Engineering 4 (4-0-12)

Prerequisite: 430640 Theoretical Soil Mechanics or Consent of the School

Review of continuum mechanics; physical and numerical modeling; constitutive models for soil and structures; selection of suitable constitutive models; numerical modeling with finite Element and finite difference; stability analysis with phi/c reduction methoc.

1. Review of continuum mechanics	(8 hours)
2. Physical and numerical modeling in geotechnical engineering	(4 hours)
3. Simple constitutive models and advanced constitutive model	
for soils and Structures	(4 hours)
4. Selection of suitable constitutive models for geotechnical material	(8 hours)
5. Numerical modeling with finite element method	(8 hours)
6. Numerical modeling with finite difference method	(8 hours)
7. Stability analysis by phi/c reduction method	

#### 430650 Deep Excavation and Tunneling

4 (4-0-12)

Condition: Consent of the School

Overview of excavation and tunneling method; selection of construction method; instrumentation types and planning; stress and deformation field around tunnel; earth pressure theories; concept of the NATM; mechanized tunneling method; cut and cover tunneling method; concept of lining design; risk assessment for deep excavation and tunneling.

#### **Course Outline**

1.	Overview of excavation and tunneling method	(4 hours)
2.	Selection of construction method	(4 hours)
3.	Instrumentation: Types and planning	(4 hours)
4.	Stress and deformation field around tunnel and Earth pressure theories	(8 hours)
5.	Concept of the NATM (New Austrian Tunneling Method)	(8 hours)
6.	Mechanized tunneling method	(8 hours)
7.	Cut and cover tunneling method	(4 hours)
8.	Concept of lining design	(4 hours)
9.	Risk assessment for deep excavation and tunneling	(4 hours)

#### 430651 Unsaturated Soil Mechanics

#### 4 (4-0-12)

Prerequisite: 430640 Theoretical Soil Mechanics or Consent of the School

Introduction to unsaturated soil problems; phase properties and relations; basic principles; stress state variables; measurement of unsaturated soil properties; flow of water in unsaturated soils; steady state and transient flows; soil water characteristic curve; hydraulic conductivity-suction relations; mechanical behavior of unsaturated soils; pore pressure parameters; volume change constitutive relations under drained and undrained loading; critical-state frameworks and applications; coupling seepage and stress-deformation analyses.

1. Introduction to unsaturated soil mechanics	(4 hours)	
2. Phase properties and relations	(4 hours)	
3. Basic principles	(4 hours)	
4. Stress state variables	(4 hours)	
5. Flow of water in unsaturated soils. Steady state and transient flows	(4 hours)	
6. Soil water characteristic curve, Hydraulic conductivity-suction relations	(8 hours)	
. Mechanical behavior of unsaturated soils		
8. Application of critical state soil mechanics to unsaturated soils	(8 hours)	
Fluid-mechanical interaction in unsaturated soils		
430652 Geostatistics	4 (4-0-12)	
Prerequisite: 430611 Statistics for Civil Engineering or Consent of the School		
Introduction to the geostatistic theory; applications in geotechnical eng	gineering.	
Course Outline		

#### Course Outline

1. Geostatistics and engineering geological applications	
2. The theory of regionalized	
3. Structural analysis (Nested structures and the nugget effect, models of	
variograms, fitting models, hole effect and proportional effect, anisotropies)	(8 hours)
4. Kriging and the estimation of engineering geological characteristics	(12 hours)
5. Sequential Gaussian and indicator simulation and co-simulation	

#### 430660 Advanced Hydrology

Condition: Consent of the School

Introduction to hydrology; hydrologic processes; atmospheric water; subsurface water; groundwater; surface water; unit hydrograph; lumped flow routing, distributed flow routing, frequency analysis.

4 (4-0-12)

#### **Course Outline** 1. Hydrologic processes (8 hours) 2. Atmospheric water (4 hours) 3. Subsurface water (4 hours) 4. Groundwater (4 hours) 5. Surface water (4 hours) (8 hours) 5. Unit hydrograph 7. Lumped flow routing (4 hours) 8. Distributed flow routing (4 hours) 9. Frequency analysis (8 hours)

#### 430661 Computational Hydraulics

4 (4-0-12)

Condition: Consent of the School

Equations and numerical solution techniques for hydraulic problems, open channels and rivers, sediment in rivers, pipe systems, groundwater flow; diffusion and dispersion in rivers.

#### **Course Outline**

1. Equations and numerical solution techniques for hydraulic problems	(4 hours)
2. Gradually varied flow in irregular open channels	(8 hours)
3. Flood waves in rivers and floodplains	(8 hours)
4. Oscillation of shallow water	(4 hours)
5. Scour and deposition of sediment in river channels	(8 hours)
6. Water hammer in pipe systems	(8 hours)
7. Surge protection and air chambers	(4 hours)
8. Seepage and groundwater flows	(8 hours)
9. Diffusion and dispersion of pollutants in rivers	(8 hours)

Condition: Consent of the School

430662 Systems Analysis

Introduction to the systems approach for solving problems; problem definition and mathematical formulation; economic theory in decision making; linear programming and dynamic programming.

#### **Course Outline**

1.	Introduction to systems approach	(4 hours)
2.	An overview of mathematical optimization methods	(4 hours)
3.	Engineering economics for decision making	(8 hours)
4.	Linear programming	(16 hours)
5.	Sensitivity analysis and the dual-primal relationships	(4 hours)
6.	Dynamic programming	(12 hours)

430663 Modeling of Hydrologic Processes

Condition: Consent of the School

Mathematical modeling and numerical solution of hydrologic processes; rainfall; losses, runoff; empirical and process based models, lumped and distributed parameters models; other modeling considerations, model capability and accuracy, optimization.

#### **Course Outline**

1.	. Mathematical modeling and numerical solution of hydrologic processes	
	Rainfall	(4 hours)
2.	Infiltration, Unsaturated and saturated flow	(4 hours)
-		(11

3. Surface storage, Evaporation

(4 hours)

4 (4-0-12)

4.	Transpiration, Interception	(4 hours)
5.	Runoff	(4 hours)
6.	Numerical representation of terrain	(4 hours)
7.	Model structure, Empirical and process based models	(8 hours)
8.	Lumped and distributed parameters	(8 hours)
9.	Model capability and accuracy	(4 hours)
10	. Model optimization	(4 hours)

430664 Water Resources Systems Analysis

Prerequisite: 430662 Systems Analysis or Consent of the School

Introduction to water resources systems; simulation techniques and mathematical programming used to analyze and plan common water resources systems.

#### Course Outline

1.	Planning and analysis of water resources systems	(4 hours)
2.	Identification and evaluation of water management plans	(8 hours)
3.	Water resources planning objectives	(4 hours)
4.	Water resources planning under uncertainty	(8 hours)
5.	Deterministic river basin modeling	(8 hours)
6.	Stechastic river basin planning models	(8 hours)
7.	Case studies	(8 hours)

#### 430665 River and Floodplain Management

Condition: Consent of the School

Nature of streamflow, fluvial processes and alluvial channel morphology; Modeling of irregular channels and floodplains; Management issues relating to rivers and floodplains.

#### **Course Outline**

1.	In roduction to river and floodplain management	(4 hours)
2.	Nature of streamflow and fluvial processes	(4 hours)
3.	Fydraulics of flow in irregular channels	(8 hours)
4.	Floodplain and estuaries	(8 hours)
5.	Floodplain management systems	(8 hours)
6.	Alluvial channel morphology	(4 hours)
7.	Alluvial channel modeling	(8 hours)
8.	Mixing processes for pollutant	(4 hours)

# 4 (4-0-12)

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#### 4 (4-0-12)

#### 430666 River Engineering

Condition: Consent of the School

Catchment characteristics; hydrological cycle; catchment areas; sediment sources and sediment yield; river hydraulics; river morphology; sediment transport; planforms; cross sections and longitudinal profiles; river improvement, construction, control of flow regimes; sediment control devices.

#### **Course Outline**

- 1. Catchment characteristics
  - -Hydrological cycle
  - -Catchment areas
    - -Sediment scurces and sediment yield
- 2. River hydraulics
  - -Water levels
  - -Discharge
  - -Relation curves
  - -Backwater curve computation and flood routing
- 3. River morphology
  - -Sediment transport
  - -Planforms of river

-Longitudinal profiles

-River bends

-Confluences and bifurcations

- 4. River engineering works
  - -Temporary river improvement
  - -Permanent river improvement
  - -Constructions

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-Control of flow regime

5. Sediment control devices

- -Bottom intake structures for mountainous streams
- -Sediment control devices and their characteristics
- 430667 Statistical Methods in Hydrology
- Condition: Consent of the School

Probability and probability distribution; properties of random variables; discrete probability distributions; normal distribution; continuous probability distributions; probability plotting and frequency analysis; confidence intervals and hypothesis testing; linear regression; correlation; multivariate analysis; analysis of hydrologic time series; stochastic hydrologic mcdels.

(8 hours)

(8 hours)

(16 hours)

(12 hours)

(4 hours)

4 (4-0-12)

1.	Probability and probability distribution	(4 hours)
2.	Properties of random variables	(4 hours)
3.	Discrete probability distributions	(4 hours)
4.	Normal distribution	(4 hours)
5.	Continuous probability distributions	(4 hours)
6.	Probability plotting and frequency analysis	(4 hours)
7.	Confidence intervals and hypothesis testing	(4 hours)
8.	Linear regression	(4 hours)
9.	Correlation	(4 hours)
10	. Multivariate analysis	(4 hours)
11	Analysis of hydrologic time series	(4 hours)
12	. Stochastic hydrologic models	(4 hours)

#### 430668 Subsurface Hydrology

#### 4 (4-0-12)

Condition: Consent of the School

Water and the subsurface environment; fluid flow and mass transport; the geologic setting; water movement in geological formations; analytical solutions to flow problems; well hydraulics; numerical solutions of the groundwater flow equation, contamination of subsurface water; groundwater-surface water interaction; remediation; multi-fluid flow and transport.

#### Course Outline

1.	Water and subsurface environment	(4 hours)
2.	Fluid flow and mass transport	(4 hours)
3.	The geologic setting	(4 hours)
4.	Water movement in geological formations	(4 hours)
5.	Analytical solutions to flow problems	(4 hours)
6.	Well hydraulics	(4 hours)
7.	Numerical solutions of the groundwater flow equation	(4 hours)
8.	Contamination of subsurface water	(4 hours)
9.	Groundwater-surface water interaction	(4 hours)
10.	Remediation	(4 hours)
11.	Multi-fluid flow and transport	(8 hours)

# 430711 Special Problems in Advanced Civil Engineering I4 (4-0-12)Condition: Consent of the School 2

Study of special problems in advanced civil engineering case studies by using advanced approaches to solve the problems or experiments.

#### 430712 Special Problems in Advanced Civil Engineering II

Condition: Consert of the School

Study of special problems in advanced civil engineering case studies by using advanced approaches to solve the problems or experiments.

#### 430713 Special Problems in Advanced Civil Engineering III 4 (4-0-12)

**Condition:** Consent of the School

Study of special problems in advanced civil engineering case studies by using advanced approaches to solve the problems or experiments.

#### 430714 Special Problems in Advanced Civil Engineering IV 4 (4-0-12)

Condition: Consent of the School

Study of special problems in advanced civil engineering case studies by using advanced approaches to solve the problems or experiments.

#### 430891 Master Thesis I

Condition: Consent of the School

Original research work leading to the preparation of a master thesis in the fulfillment of the requirement for the master degree. Enrollees are bachelor degree holders.

#### 430892 Master Thesis II

Condition: Consent of the School

Original research work leading to the preparation of a master thesis in the partial fulfillment of the requirement for the master degree.

#### 430893 Doctoral Thesis I

Condition: Consert of the School

Original research work leading to the preparation of a doctoral thesis in the fulfillment of the requirement for the doctoral degree.

#### 430894 Doctoral Thesis II

Condition: Consent of the School

Original research work leading to the preparation of a doctoral thesis in the partial fulfillment of the requirement for the doctoral degree.

#### 430895 Doctoral Thesis III

Prerequisite: Consent of the School

Original research work leading to the preparation of a doctoral thesis in the partial fulfillment of the requirement for the doctoral degree.

(45 credits)

(60 credits)

(60 credits)

(20 credits)

(45 credits)

#### 18. Curriculum Quality Assurance

1) Program Management

The programs are administered by the Schools with the approval of the Institute. The aim is to create programs which are up-to-date, flexible and relevant to the needs of students, in order that they can apply what they learn to develop themselves and be successful personally and professionally.

2) Teaching and Learning Resources

A wide variety of instructional media, an outstanding teaching staff, the ampus buildings, the financial resources available, the library, the e-learning and the e-training facilities all enhance the learning experience

3) Counseling

1

Academic advisors, teaching assistants, and special tutorial classes are provided for students.

4) High consumer satisfaction

Graduates' performance is given high evaluation by subsequent employers.

#### **19. Curriculum Revision**

The preceding curriculum has been started in the academic year 1999. The revised curriculum is done so as to include new knowledge and advancement. It consists of three fields; namely, structural, geotechnical, and water resources engineering. New courses are added and outdated courses were taken out. The study program consists of core and major courses, electives and thesis. The core courses are common to every field and the major courses are for each field. In this revision, the six-digit course number has been changed from 410XXX to 430XXX according to the new Institute and School codes. The comparison of the revised and preceding curriculums is tabulated as follows.

NO.	Preceding Curriculum	Cr.	Revised Curriculum	Cr.	Note
1	410501 Numerical Method in	4	430610 Numerical Methods in	4	Revise the course
	Engineering		Engineering		content
2	413502 Systems Analysis	4	430662 Systems Analysis	4	Revise the course
3	410603 Statistics for Civil	4	430611 Statistics for Civil Engineering	4	Revise the course
4	410604 Advanced Engineering	4	430612 Advanced Engineering	4	Revise the course
5	410610 Continuum Mechanics	4	430613 Continuum Mechanics	4	Revise the course content
6	410611 Advanced Mechanics of Materials	4	430622 Advanced Mechanics of Materials	4	Modify the course content

7	410612 Theory of Elastic Stability	4	430624 Theory of Elastic Stability		Revise the course content
. 8	410613 Experimental Method in Civil Engineering	4	430632 Experimental Method in Civil Engineering	4	Revise the course content
9	410620 Advanced Theory of Structures	4	430620 Advanced Theory of Structures	4	Modify the course content
10	410621 Advanced Matrix Method for Structures	4	430623 Advanced Matrix Method for Structures	4	Revise the course content
11	410622 Finite Element Method	4	430626 Advanced Finite Element Method	4	Modify the course
12	410623 Reinforced Concrete Structures	4	430628 Reinforced Concrete Structures	4	Revise the course content
13	410624 Steel Structures	4	430631 Steel Structures	. 4	Revise the course content
14	410625 Advanced Prestressed Concrete	4	430629 Advanced Prestressed Concrete	4	Revise the course - content
15	410626 Theory of Flate and Shell	4	430625 Theory of Plates and Shells	4	Modify the course title and content
16	410627 Advanced Concrete Technology	4	430627 Advanced Concrete Technology	4	Modify the course content
17	410628 Timber Structures	. 4			Canceled
18	410629 Masonry Structures	4	430630 Masonry Structures	4	Revise the course
19	410630 Design of Edvanced Composite in Civil Engineering Structures	4	430637 Design of Advanced Composite in Civil Engineering Structures	4	Modify the course
20	410631 Dynamics of Structures	4	430621 Dynamics of Structures	4	Revise the course content
21	410632 Wind Effects on Structures	4	430633 Wind Effects on Structures	4	Revise the course content
22	410633 Earthquake-Resistant Design	4	430634 Earthquake-Resistant Design	4	Revise the course content
23	410634 Structural Control	4	430635 Structural Control	4	Revise the course content
24	410641 Construction Method and Equipment	4	-		Canceled
25	410642 Analytica. Construction Management	4	-		Canceled

26	410643 Problem Analysis in Construction Industry	4	-		Canceled
27	410644 Construction Project Administration	4	-		Canceled
28	410650 Theoretical Soil Mechanics	4.	430640 Theoretical Soil Mechanics	-4	Modify the course
29	410651 Laboratories, Field Testing, and Instrumentation	4	430643 Laboratory, Field Testing, and Instrumentation in Geotechnical Engineering	4	Modify the course title and content
30	410652 Advanced Foundation Engineering	4	430641 Advanced Foundation Engineering	4	Modify the course content
31	410653 Ground Improvement Techniques	4	430642 Ground Improvement Techniques	4	Modify the course .
32	410654 Soil Dynamics	4	430644 Soil Dynamics	4	Modify the course content
33	410655 Geomechanics	4	430645 Geomechanics	4	Revise the course content
34	410656 Earth Dam Design	4	430646 Earth Structures	4	Modify the course title and content
35	410657 Rock Mechanics	4	430647 Rock Mechanics	. 4	Revise the course content
36	410658 Analytical Method in Geotechnical Engineering	4	430648 Analytical Method in Geotechnical Engineering	4	Modify the course content
37	410660 Water Resource Systems Analysis	4	430664 Water Resources Systems Analysis	. 4	Revise the course content
38	410661 Modeling of Hydrologic Processes	4	430663 Modeling of Hydrologic Processes	· 4	Revise the course content
39	410662 Advanced Hydrology	4	430660 Advanced Hydrology	4	Revise the course content
40	410663 Computational Hydraulics	4	430661 Computational Hydraulics	4	Revise the course content
41	410664 River and Floodplain Management	4	430665 River and Floodplain Management	4	Revise the course content
42			430601 Introduction to Finite Element Method	4	New course added
43			430602 Graduate Seminar in Civil Engineering I	1	New course added
44			430603 Graduate Seminar in Civil Engineering II	1	New course added

45	430636 Mechanics of Composite Materials	4	New course added
¥6	• 430638 Advanced Analytical Tools in Cement Based Materials	4	New course added
47	430649 Numerical Modeling for Geotechnical Engineering	4	New course added
48	430650 Deep Excavation and Tunneling	· 4	New course added
49	430651 Unsaturated Soil Mechanics	4	New course added
50	430652 Geostatistics	4	New course added
51	430666 River Engineering	4	New course added
<b>*</b> 52	430667 Statistical Methods in Hydrology	. <b>4</b>	New course added
53	430668 Subsurface Hydrology	4	New course added

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Appendix A Curriculum Improvement Committee



คำสั่งมหาวิทยาลัยเทคโนโลยีสุรนารี ที่ ๔๔๔ /๒๕๔๕

เรื่อง แต่งตั้งคณะกรรมการปรับปรุงหลักสูตรวิสวกรรมศาสตรมหาบัณฑิตและดุษฎีบัณฑิด สาขาวิชาวิศวกรรมโยธา (หลักสูตรปรับปรุง พ.ศ. ๒๕๕๐)

เพื่อให้การปรับปรุงหลักสูตรวิศวกรรมศาสตรมหาบัณฑิตและดุษฎีบัณฑิต สาขาวิชา ริสวกรรมโยธา เป็นไปด้วยกวามเรียบร้อย และบรรลูตามวัตถุประสงค์

- ระนั้น อาศัยอำนาจคามความในมาตรา ๑៩ (๑) (๑๑) มาตรา ๒๑ และมาตรา ๒๔ แห่งพระราชบัญญัติ มหาวิทยาลัยเทกในโลยีสุรนารี พ.ศ. ๒๕๓๓ ประกอบกับมดิสภาวิชาการมหาวิทยาลัยเทกโนโลยีสุรนารี ในการประชุมครั้งที่ ๘/๒๕๔ธ เมื่อวันที่ ๒๐ กรกฎาคม ๒๕๔ธ ประกอบกับประกาศสำนักนายกรัฐมนตรี แร้้อง แต่ะอั้งอธิธารบดีมหาวิทยาลัยเทคโนโลยีสุรนารี ลงวันที่ ๓๑ พฤษภาคม ๒๕๔๘ จึงแต่งตั้งคณะกรรมการ ปรับปรุงหลักสูตรวิสวกรรมสาสตรมหาบัณฑิตและดุษฎีบัณฑิต สาขาวิชาวิสวกรรมโยธา (หลักสูตรปรับปรุง พ.ศ. ๒๕๕๐) บระกอบด้วยบกกลดังต่อไปนี้

- ๑. รองสาสตราจารย์ คร.ปริญญา จินคาประเสริฐ
- ๒. ศาสตราจารย์ คร.สมชาย ชูชีพสกุล
- รองศาสตราจารย์ คร.วรากร ไม้เรียง
- รองศาสตราจารย์ คร.อำนาจ อภิษาติวัลลภ
- รองศาสตราจารย์ คร.สิทธิชัย แลงอาทิตย์
- ผู้ช่วยสาสตราจารย์ คร.วีรพันธ์ สรีบุญลือ
- ผู้ช่วยศาสตราจารย์ คร.มงกล จรรัชรเคช
- ส. อาจารย์ คร.ทนงศักดิ์ พิสาลสิน
- หัวหน้าสาขาวิชาวิศวกรรมโยธา
- ๑๐. ผู้ช่วยศาสตราจารย์ คร.สูงสันติ์ หอพิบูลสุข

ทั้งนี้ ตั้งแต่วันที่ ๒๑ กรกฎากม ๒๕๔៩ เป็นด้นไป

เป็น ประธาน เป็น รองประธาน เป็น กรรมการ เป็น กรรมการ เป็น กรรมการ เป็น กรรมการ เป็น กรรมการ เป็น กรรมการ เป็น กรรมการและเลขานุการ เป็น กรรมการและผู้ช่วยเลขานการ

อธิการบดีมหาวิทยาลัยเทค โนโลยีสุรนารี งาว ถนนมหาวิทยาลัย ทำบลสุรนารี อำเภอเมือง จังหวัดนครราชสีมา 30000 โทรศัพท์ (044) 223000 โทรสาร (044) 224070 N IVE CHNO AR ΕE U 1 UNIVERSITY AVENUE, SUE DISTRICT SURANAREE, MUANG DISTRICT, NAKHON RATCHASIMA 30000, THAILAND Tel, (044) 223000 Fax. (044) 224070

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สั่ง ณ วันที่ ๗ สิงหาคม พ.ศ. ๒๕๔ธ



กำสั่งมหาวิทยาลัยเทคโนโลยีสุรนารี ที่ 9 เว /๒๕๕๐

เรื่อง แต่งตั้งกณะกรรมการปรับปรุงหลักสูดรวิศวกรรมศาสตรมหาบัณฑิตและดุษฎีบัณฑิต สาขาวิชาวิศวกรรมโยธา (หลักสูตรปรับปรุง พ.ศ. ๒๕๕๐) เพิ่มเดิม

อนุสนธิกำสั่งมหาวิทยาลัยเทกโนโลยีสุรนารี ที่ ๔๕๔/๒๕๔៩ ลงวันที่ ๗ สิงหาคม ๒๕๔៩ ได้แต่งตั้งคณะกรรมการปรับปรุงหลักสูตรวิศวกรรมศาสตรมหาบัณฑิตและคุษฎีบัณฑิต สาขาวิชา วิศวกรรมโยธา (หลักสูตรปรับบรุง พ.ศ. ๒๕๕๐) นั้น

เพื่อให้การปรับปรุงหลักสูดรวิศวกรรมศาสตรมหาบัณฑิดและดุษฎีบัณฑิด สาขาวิชา วิศวกรรมโยธา เป็นไปด้วยความเรียบร้อย และมีประสิทธิกาพยิ่งขึ้น ฉะนั้น อาศัยอำนาจตามความในมาดรา ๑៩ (๑) (๑๑) มาดรา ๒๑ และมาตรา ๒๔ แห่งพระราชบัญญัติมหาวิทยาลัยเทคโนโลยีสุรนารี พ.ศ. ๒๕๓๓ ประกอบกับมดิ สภาวิชาการมหาวิทยาลัยเทคโนโลยีสุรนารี ในการประชุมครั้งที่ ๑๔/๒๕๔៩ เมื่อวันที่ ๒๘ พฤศจิกายน ๒๕๔ธ ประกอบกับประกาศสำนักนายกรัฐมนตรี เรื่อง แต่งตั้งอธิการบดีมหาวิทยาลัยเทคโนโลยีสุรนารี ลงวันที่ ๓๑ พฤษภาคม ๒๕๔๓ จึงแต่งตั้งคณะกรรมการปรับปรุงหลักสูตรวิศวกรรมศาสตรมหาบัณฑิด และดุษฎีบัณฑิด สาขาวิชาวิศวกรรมโยธา (หลักสูตรปรับปรุง พ.ศ. ๒๕๕๐) เพิ่มเติม ประกอบด้วยบุคคล ดังต่อไปนี้

o.	ผู้ช่วยศาสตระจารย์ คร.ฉัครชัย โชคิษฐยางกูร	เป็น	ពិវិនិឯការ
لە.	อาจารย์ คร.พรพจน์ ดันเส็ง	เป็น	กรรมการ
ள.	อาจารย์ คร. ๖วิรุทธิ์ ชินกุลกิจนิวัฒน์	เป็น	กรรมการ
ፈ.	อาจารย์ คร.ธีรวัฒน์ สินศิริ	เป็น	ករវរសារ

ทั้งนี้ คั้งแต่วันที่ ๒៩ พฤศจิกายน ๒๕๔៩ เป็นค้นไป

สั่ง ณ วันที่ ดี มกราคม พ.ศ. ๒๕๕๐ (รองศาสตราจารย์ ดร.ประสาท สืบค้า) อธิการบดีมหาวิทยาลัยเทก โนโลยีสรนารี

111 ถนนมหาวิทยาลัย ดำบลสุรนารี อำเภอเมือง จังหวัดนครราชสีมา 30000 โทรศัพท์ (044) 223000 โทรสาร (044) 224070
 SURANARE UNIVERSITY AVENUE, SUB DISTRICT SURANAREE, MUANG DISTRICT, NAKHON RATCHASIMA 30000, THAILAND Tel. (044) 223000. Fox. (044) 224070

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# **Appendix B SUT Regulation for Graduate Studies**



# **Biographical Data**

Institute of Engineering, Suranaree University of Technology 111 University Avenue, Muang District, Nakhon Ratchasima 30000 Tel: 0 4422 4221 FAX: 0 4422 4220



amnat@sut.ac.th

### รองศาสตราจารย์ ดร.อำนาจ อภิชาติวัลลภ Associate Prof. Dr. Amnat Apichatvullop

1972 B.E. (Civil) University of Newcastle, N.S.W.1976 M. Eng. (Coastal), Asian Institute of Technology

1984 Ph.D. (Water Resources Planning), Colorado State University



Work Experience

Education and Competence

1. Lecturer, School of Civil Engineering, Suranaree University of Technology.

1.1	Employment :	
	1973-74	Lecturer, Faculty of Engineering, Khon Kaen University (KKU)
	1976-77	Research Associate, Water Resources Eng. Div., Asian
		Institute of Technology
	1977-80	Lecturer and Assistant Professor, Faculty of Engineering, KKU
	1985-93	Assistant Professor and Associate Professor, Faculty of
•		Engineering, KKU
	1986-90	Director, Water Resources and Environment Instittute, Faculty
	,	of Engineering, KKU
	1986-87	Chair, Graduate Study Committee, Faculty of Engineering,
		кки
	1992-93	Associate Dean, Faculty of Engineering, KKU
	1993-1999	Associate Professor, Institute of Industrial Technology,
		Suranaree University of Technology (SUT)
	1994-1997	Associate Dean, Institute of Industrial Technology, SUT
	1989-90	Engineering Consultant (hydrologist), PAL Consultant Co.
	1990-present	(part-time) Engineering Consultant, TEAM Consultant. and
		ASDECON Co.
	1999-2002	Head, Department of Civil Engineering, Institute of
		Engineering, Suranaree University of Technology (SUT)
	2002 – Present	Lecturer, School of Civil Engineering, Suranaree University of
		Execution, Suranaree University of Technology,





#### Project Undertaken:

1992-present	ASDECON Corp. (Part-time)
	Hydrologist, responsible for hydrological studies of
	various projects such as Sai Noi-Sai Yai Dam, Tha
	Dan Dam.
1991-1992	Team Consulting Engineer Co. (Part-time) Hydrologist,
	responsible for hydrological studies of various projects such
	as Feasibility of Prasae Irrigation, Feasibility of Pasak
	Irrigation, etc.
AprMay and	Aug. 1992 Consultant to Asian Development Bank, appraised
	technical aspects of three pump irrigation schemes in southern
	Lao P.D.R.
1989-1991	PAL Consulsultant (Full-time, on leave from KKU.):
1990-1991	Deputy project manager/Hydrologist in Feasibility of the Nam
	Songkhram Irrigation Project.
Dec.1989- Mar.	1990 Water resource planning specialist in Feasibility
	of the Khong-Chi-Mun Project
OctNov.1989	Water resource and infrastructure specialist in Evaluation of
	the Thai-German Land Settlement Promotion Project
	responsible for collecting data and assessing water resource
	development activities in Khuan Bhumibol and Lam Dom Noi
	Settlements.
May-Jun.1989	Irrigation and training specialist, Appraisal of Proposals in the
	Thai-Netherlands NE Agricultural Development : On-farm
	water management (Royal Irrigation Development), Small
	farmer participation (Department of Agricultural Extension),
	Ley Farming (Department of Land Development) Northeast
	land development center (Department of Public Welfare).
	Each proposal was appraised on relevance and significance of
	objectives, anticipated achievements, technical merits of
	methods used, expected benefits and efficiency of resource
	use.
Jan.1988-Aug	1989 Project leader, Study of Weir Maintenance Program.
	To design a more efficient system/program to maintain and

utilize existing small weirs.





May 1987-Dec. 1990 Project leader, Hydrology of Rainfed Paddy Land. To develop mathematical model for predicting streamflow in small agricultural watrsheds of Northeast Thailand.

Oct.1986-Jun.1987 Project leader, Training of Community Workers in Rural Water Resources Planning. Responsible for developing courses, training materials, training and follow-up of all CD workers in the Northeast.

1978-1979 Hydrologist/Irrigation Engineer, Water Balance of the Nong Wai Irrigation Area. Responsible for evaluating the water use efficiency.

1978-1979 Hydrologist, Physical and Chemical Aspects of the Nam Pong Reservoir. Responsible for evaluating the impacts of land use on the streamflows in the Nam Pong Watershed.

 Hydraulic Engineer, Water for Chieng Khong Refugee Camp.
 Design pumping, delivery, distribution and storage system of water supply for the camp and nearby village.

Hydraulic Engineer, Feasibitity of Lam Sathat Weir. Design irrigation weir.

> Water Resources Planning Engineer, Feasibility of Water Resources Development in three settlements. Survey, plan and design appropriate water facilities for drinking, domestic use and irrigation for several villages in the settlements.

1976-1977 Research Associate, Salinity Intrusion of the Chao Phya and Mae Klong Rivers. Develop mathematical model capable of simulationg salinity conditions of the rivers for different river discharges.

#### Other Training :

1980

1979

Regional Workshop for Instructors and Trainers on Low-Cost Water Supply and Sanitation Technology by Internations Training Network, The World Bank, October 14-24, 1986, Bandung, Indonesia.



Associate Prof. Dr. Amnat Apichatvullop, Ph.D.



- 1960-1968Ministry of Education Scholoarship for Secondary Education.1968-1973Colombo Plan Scholarship
- 1974-1976 Japanese Government Scholarship
- 1930-1983 Ford Foundation Fellowship

1983-1984 Research Assistantship at Colorado State University

La Contraction Academic Works:

- 1. Salinity Intrusion in the Chao Phya and Mae Klong Rivers, Reserarch report, Asian Institute of Technology, 1978.
- Physical and Chemical Aspects of the Nam Pong Reservoir, Research Report, Faculty of Engineering, Khon Kaen University, 1979.
- Water Blance of the Nong Wai Irrigatin Area, Research Report, Faculty of Engineering, Khon Kaen University, 1979.
- 4. Hydraulic Design. Faculty of Engineering, Khon Kaen University, 1980. (Thai)
- Feasibility Study of Water Resources Development in Ubolrat, None Sang and Huai Luang Resettlement Areas, Project Report, Faculty of Engineering, Khon Kaen University, 1979.
- Water for Chieng Khong Refugee Camp, Project Report, Faculty of Engineering, Khon Kaen University, 1979.
- 7. Feasibility of the Lam Sathat Weir, Amphur Pathai, Project Report, Faculty cf Engineering, Khon Kaen University, 1979. (Thai)
- 8. Water Resources Project Planning, Manual, Thai-Australia Water Resoruces Project, 1986. (Thai)
- 9. Training in Water Resources Planning, Document for Training of Instructors, Faculty of Engineering, Khon Kaen University, 1987. (Thai)
- 10. Bibliography of Water Resources Development in Thailand, Project, Faculty of Engineering, Khon Kaen University, 1987.
- 11. Fundamental Systems Analysis. Faculty of Engineering, Khon Kaen University, 1987. (Thai)
- 12. Fluid Mechanics Laboratory, Manual, Faculty of Engineering, Khon Kaen University, 1987; (Thai)

Associate Prof. Dr. Amnat Apichatvullop, Ph.D.



- Sethabutra, S. and Apichatvullop, A.Hydrology of Rainfed Paddy Land, in Proceedings of His Majesty's Fifth Cycle Commemorative Conference of USAID Sciences Research Award Grantees, Nakorn Pathom, Thailand, 24-26 July 1987, pp. 285-290.
- Aryupong, C. and Apichatvullop, A. Water for agriculture in small watersheds, Proceedings of "Crop Production in Problem Soils in Northeast Thailand, Agricultural Development Research Center, Khon Kaen, Thailand, 23-27 May 1987, pp. 101-112.
- Tingsanchali, T. and Apichatvullop, A. Salinity intrusion problem during severe drought in the Chao Phraya River, Research Report no. 122, Asian Institute of Technology, December 1980.
- Tingsanchali, T. and Apichatvullop, A.Prediction of Salinity Intrusion during a severe drought in the Chao Phraya River, Engineering Journal of Thailand v. 40, n. 3, 1987.
- 17. Thai-Netherlands Northeastern Agricultural Development Programme (January 1990-December 1992) : Appraisal Report, Department of Technical and Economic Cooperation Thailand in Cooperation with directorate General For International Cooperation, The Netherlands, July 1988.
- Apichatvullop, A. Evaluation of the Thai-German Land-Settlement Promotion Project, Phase V. (1987-1988). Final Report Infrastructure Sector, Department of Technical and Economic Cooperation, Thailand in cooperation with Bundes ministerium fuer wirtschaftriche Zusammenarbeit (BMZ), Germany, November 1989.
- Apichatvullop, A. and Patamatamkul, S. Rapid Appraisal of Moungkao, Pakkoung and Phone Ngam Pump Irrigation Schemes, Report to the Asian Development Bank, August 1992.
- 20. Hydrology of Rainfed Paddy Land, Final Report, Faculty of Engineering, Khon Kaen University, 1995.
- 21. Maximum Probable Flood for Pasak Project, Feasibility and Environmental Impact Study of Pasak Project, Proceeding of "Symposium on Maximum Inflow Spillway Design Flood for Storage Dams" Royal River Hotel, Bangkok, 19-20 February 1998.
- 22. Flood Study of Wastewater Treatment Plant for Srisaket Municipality, Report to the Srisaket Municipality, October 2002. (in Thai)



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#### Assist. Prof. Dr. Mongkol Jiravacharadet

1990 B.E. (Civil Engineering) Chulalongkorn University, THAILAND

1993 M.Eng. (Civil Engineering) University of Tokyo, JAPAN

1996 Ph.D. (Civil Engineering) University of Tokyo, JAPAN

Assistant Professor, School of Civil Engineering, Suranaree University of Technology

Dec.1996 – Present Feb.1999 Dec.1999 – Aug.2001 Mar.2002 – Sep.2004

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1990

1991 - 1995

Lecturer, School of Civil Engineering, Suranaree University of Technology Assistant Professor Assistant Rector in Buildings & Grounds Acting Head of School of Civil Engineering Head of School of Civil Engineering

First Class Honor (Gold Medal) for B.E. Degree

Monbucha Scholarship from Japanese Goverment for M.Eng and Ph.D. Degrees

#### (1) Research Publications

- J. Mongkol, and T. Nomura, "Application of an Eddy Viscosity Model to Finite Element Analysis of Turbulent Flow around a Circular Cylinder," Annual Conference of Japan Society of Civil Engineering(JSCE) 1993.
- J. Mongkol, and T. Nomura, "Application of an Eddy Viscosity Model to Finite Element Analysis of Turbulent Flow around a Circular Cylinder," WCCM III The Third World Congress of Computational Mechanics International Association for Computational Mechanics, August 1-5, 1994, Chiba, Japan, pp. I-188, 189.
- J. Mongkol, B. Bhartia, and Y. Fujino, "Optimal Saturation Control of SDOF Structure," Proceeding of the 17th Symposium on Information System, Architecture Institute of Japan, 1994, pp. 433-438.

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- J. Mongkol, B. Bhartia, and Y. Fujino, "Optimal Linear-Saturation Control of Structure by Modal Decomposition," EASEC-5 BUILDING FOR 21ST CENTURY, Proceedings of the fifth East Asia-Pacific Conference of structural Engineering and Construction, July 25-27, 1995, Gold Coast, Queenland, Australia, pp. 1455-1460.
- J. Mongkol, B. Bhartia, and Y. Fujino, "Optimal Linear-Saturation Control of MDOF Structure by Modal Approach," Annual Conference of Japan Society of Civil Engineering (JSCE) 1995.
- J. Mongkol, B. Bhartia, and Y. Fujino, "On Linear-Saturation (LS) Control of Buildings," Earthquake Engineering & Structural Dynamics Journal, Vol. 25, 1353-1371, 1996.
- 7. Jiravacharadet, M., "Noise Control in Building," Civil Engineering Magazine, Engineering Institute of Thailand, 10, 3, July-September 1998.
- Jiravacharadet, M., "Development of Light-weight Aggregate Concrete from Baked Silty Sand," Research Report No. SUT4-410-41-9-24, Suranaree University of Technology, Thailand, 1999.
- 9. Jiravacharadet, M. "Mechanical Properties of Light-weight Aggregate Concrete from Crushed Masonry," Suranaree J. Sci. Technol 6:91-96, 1999.
- Jiravacharadet, M. "Optimal Height for Steel Roof Truss Design," Suranaree J. Sci. Technol 7:149-153, 2000.
- Jiravacharadet, M., "Development of Structural Analysis and Design Website," Research Report No. SUT7-712-43-12-44, Suranaree University of Technology, Thailand, 2001.
- 12. Jiravacharadet, M., "Design to Prevent Floor Vibrations in Steel Structures," Thailand Engineering Journal, Vol. 3, 86-89, 2002.
- 13. Jiravacharadet, M., "Bone-shaped Short Fiber Composite," Thailand Engineering Journal, Vol. 4, 108-109, 2002.
- Jiravacharadet, M., "Structural Damage Identification Using Eigensystem Realization Algorithm," Proceedings of the Eight National Convention on Civil Engineering, Khon Kaen, Thailand, 2002.
- Jiravacharadet, M., "Wind Force Acting on Sign Structures According to ASCE Standard 7-98," Civil Engineering Magazine, Engineering Institute of Thailand, Vol. 1, Jan.-Feb., 2003.



- Phornpilai KITIRATTRAKARN and Mongkol JIRAVACHARADET, "Vibration of Precast-Prestressed Slab from Human Activities," Engineering Innovative for Sustainable Resource Management, 40<sup>th</sup> Academic Seminar, Faculty of Engineering, Khon Khaen University, 23-25 Jan. 2004.
- Atiwatch VIMUTHASUUNGVIRIYA and Mongkol JIRAVACHARADET, "Wind Speed for Structural Analysis in Thailand," Engineering Innovative for Sustainable Resource Management, 40<sup>th</sup> Academic Seminar, Faculty of Engineering; Khon Khaen University, 23-25 Jan. 2004.
- Atiwatch VIMUTHASUUNGVIRIYA and Mongkol JIRAVACHARADET, "Wind Speed for Structural Analysis and Design in Thailand," 9<sup>th</sup> National Conference in Civil Engineering, Petchburi, 19-23 May 2004.
- Phornpilai KITIRATTRAKARN and Mongkol JIRAVACHARADET, "Vibration of Precast-Prestressed Slab from Human Activities," 9<sup>th</sup> National Conference in Civil Engineering, Petchburi, 19-23 May 2004.
- 20. Vacharapol BOACHAREON and Mongkol JIRAVACHARADET, "Effect of Soil-Structure Interaction for High-Rise Building Design in Bangkok," 11<sup>th</sup> National Conference in Civil Engineering, Phuget, 20-22 April 2006.
- 21. Phornpilai KITIRATTRAKARN and Mongkol JIRAVACHARADET, "VIBRATION ANALYSIS OF PRECAST-PRESTRESSED CONCRETE SLABS UNDER AEROBIC LOADS," Proceedings of the Tenth East Asia-Pacific Conference on Structural Engineering & Construction (EASEC-10), August 3-5, 2006, Bangkok, Thailand
- 22. Watcharapon BAOJAROEN and Mongkol JIRAVACHARADET, "NON-LINEAR SOIL-STRUCTURE INTERACTION ANALYSIS OF BUILDINGS SUBJECTED TO EARTHQUAKE LOADING IN BANGKOK," Proceedings of the Tenth East Asia-Pacific Conference on Structural Engineering & Construction (EASEC-10), August 3-5, 2006, Bangkok, Thailand

#### (2) Published Textbooks

- 1. Mechanics of Materials
- 2. Structural Steel Design
- 3. Reinforced Concrete Design



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-Education	and C	ompe	tence:	
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B. Eng. (Civil Engineering), Khon Kaen University, Thailand
M. Eng. (Soil Engineering), Asian Institute of Technology, Thailand
Ph.D. (Geotechnical Engineering), Saga University, Japan.
Certificate on Computer Aided Design (CAD) of City Planning,

Architecture Design and Interior, MOST, China

2002 - 2004	Lecturer, Suranaree University of Technology, Thailand
2004 - present	Assistant Professor, Suranaree University of Technology,
	Thailand
2004	Visiting Faculty, Graz University of Technology, Austria
2006 - present	Head, Construction Technology Research Unit,
	Institute of Engineering, Suranaree University of Technology,
	Thailand

- Awards and Scholarships: 1 1 1 1 1 2
  - 1996 B.Eng. with Honor awards
  - 1996 RTG scholarship for M. Eng. study at AIT
  - 1998 JIRCAS scholarship for research in Japan
  - 1998 MONBUSHO scholarship for Ph.D. study at Saga University
  - 2006 Best Young Researcher Award, Suranaree University of Technology



- (1) 8 national journal papers.
- (2) 11 international journal papers.
- (3) 4 technical reports
- (4) 16 national conference papers
- (5) 32 international conference papers
- (6) 2 books



5 Master theses

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# Selected Publications:

#### International Journal papers

- 1) Horpibulsuk, S., Shibuya, S., Fuenkajorn, K. and Katkan, W. (2007), "Assessment of Engineering Properties of Bangkok clay", Canadian Geotechnical Journal. Vol.44, No.2, pp.
- Horpibulsuk, S., Katkan, W., Sirilerdwattna, W., and Rachan, R. (2006), "Strength development in cement stabilized low plasticity and coarse grained soils : Laboratory and field study", *Soils and Foundations*, Vol.46, No.3, pp.351-366.
- 3) Horpibulsuk, S. (2005), "Mechanism controlling undrained shear characteristics of induced cemented clays", *Lowland Technology International*. Vol.7, No.2, pp.9-18.
- 4) Horpibulsuk, S., Miura, N., Nagaraj, T.S. (2004), "Clay-water/cement ratio Identity of cement admixed soft clay", *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Vol.131, No.2, pp.187-192.
- 5) Horpibulsuk, S., Miura, N., and Bergado, D.T. (2004), "Undrained shear behavior of cement admixed clay at high water content", *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Vol.130, No.19, pp.1096-1105.
- 6) Horpibulsuk, S., Miura, N., Koga, H., and Nagaraj, T.S. (2004), "Analysis of strength development in deep mixing A field study", *Ground Improvement Journal*, Vol.8, No.2, pp.59-68.
- 7) Horpibulsuk, S., Bergado, D.T., and Lorenzo, G.A. (2004), "Compressibility of cement admixed clays at high water content", *Geotechnique*, Vol.54, No.2, pp.151-154.
- 8) Horpibulsuk, S. and Rachan, R. (2004), "Modified hyperbolic model for capturing undrained shear behavior", *Lowiand Technology International*, Vol.6, No.2, pp.11-20.
- Horpibulsuk, S., Miura, N., and Nagaraj, T.S. (2003), "Assessment of strength development in cement-admixed high water content clays with Abrams' law as a basis", *Geotechnique*, Vol.53, No.4, pp.439-444.
- Bergado, D.T., Sasanakal, I., and Horpibulsuk, S. (2003) "Electro-Osmotic Consolidation of Soft Bangkok Clav Using Cooper and Carbon Electrodes with PVD", *Geotechnical Testing Journal*, ASTM, Vol.26, No.3, pp.1-12.
- 11) Miura, N., Hcrpibulsuk, S., and Nagaraj, T.S. (2001) "Engineering behavior of cement stabilized clay at high water content", *Soils and Foundations*, Japan Geotechnical Society (JGS), Vol.41, No.5, pp.33-45.

#### International Conference, Symposium and Seminar Papers

 Horpibulsuk, S., Katkan, W., and Piyasaengthong, S. (2006), "Prediction of compaction curves of fine-grained soils at various compaction energies using one point test", Proceedings of 6th International Symposium on Soil/Ground Improvement and Geosynthetics.





- Horpibulsuk, S., Suesook, J., Liu, M.D. and Carter, J.P. (2006), "Simulation of undrained shear behavior of cemented clay with the modified structured cam clay model", Proceedings of 6th International Symposium on Soil/Ground Improvement and Geosynthetics.
- Nagaraj, T.S. and Horpibulsuk, S. (2006), "Composite soft ground Its installation and characterization", National Conference on Corrective Engineering Practices in Troublesome Soils (CONCEPTS), Kakinada, India, pp.15-20. (Invited lecture).
- 4) Horpibulsuk, S., Rachan, R., Papattanotai, S., Nagaraj, T.S. (2006), "Analysis of strength development of cement stabilized clay from microstructural considerations", *Proc. International Symposium on Lowland Technology*.
- 5) Horpibulsuk. S., Rachan, R. and Katkan, W. (2006), "Prediction of compaction curve at various compaction energies using one point test", *Proc. International Symposium on Lowland Technology.*
- 6) Rachan, R., and Horpibulsuk, S. (2006), "Effect of chemistry and mineralogy on geotechnical properties of Bangkok clay", *Proc. International Symposium on Lowland Technology*.
- Horpibulsuk, S., Rachan, R., Katkan, W. and Nagaraj, T.S. (2006) "Strength development in cement stabilized coarse grained soils", *GeoShanghai 2006*, Geotechnical Special Publication No.152, pp.51-56.
- 8) Liu M. D., Carter, J.P., Horpibulsuk, S. and Liyanapathirana, D.S. (2006), "Modelling the behaviour of cemented clay", *Geo-Shanghai 2006*, Geotechnical Special Publication No.152, pp.37-44.
- Horpibulsuk, S. and Rachan, R. (2005), "On the classification of Bangkok clay deposits and their compressiobility", *International Symposium on Frontiers in Offshore Geotechnics*, Perth, pp.1071-1077.
- 10) **Horpibulsuk, S.**, and Rachan, R. (2004), "Novel approach for analyzing compressibility and permeability characteristics of Bangkok clayey soils", *Proc.* 15<sup>th</sup> Southeast Asian Geotechnical Engineering Conference, Bangkok, Thailand, pp.3-8.
- 11) **Horpibulsuk, S.** (2004), "Phenomenological model for predicting strength of cement admixed clays", *Proc. 5<sup>th</sup> International Symposium on Ground Improvement and Geosynthetics*, Bangkok, Thailand, pp.138-144.
- 12) **Horpibulsuk, S.**, Rachan, R. and Katkan, W. (2004), "Phenomenological modeling of compaction curve", *Proc.* 5<sup>th</sup> *International Symposium on Ground Improvement and Geosynthetics*, Bangkok, Thailand, pp.131-137.
- 13) Horpibulsuk, S., Katkan, W., Rachan, R., and Nagaraj, T.S. (2004), "Underpinning technique for repairing cracked building in northeast Thailand", *Proc. International Symposium on Lowland Technology*.
- 14) Horpibulsuk, S., and Rachan, R. (2004), "Novel approach for analyzing compressibility and permeability characteristics of Bangkok clayey soils", *Proc.* 15<sup>th</sup> Southeast Asian Geotechnical Engineering Conference, pp.3-8.
- 15) **Horpibulsuk, S.** and Rachan, R. (2003), "Undrained strength characteristics of cement admixed clay", *Proc.* 56<sup>th</sup> Canadian Geotechnical Conference, Canada.

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- 16) Rachan, R. and Horpibulsuk, S. (2003), "Prediction of strength of cement admixed clays", *Proc.* 56<sup>th</sup> Canadian Geotechnical Conference, Canada.
- 17) Nagaraj, T.S., Miura, N., and Horpibulsuk, S. (2003), "Composite soft ground with columnar inclusions of required strength", *Proc. Symposium on Advances in Geotechnical Engineering*, Indian Institute of Technology, India, pp.89-99.
- 18) Horpibuksuk, S. and Rachan, R. (2002), "Strength development in cement admixed clays at high water content", *Proc. Ground Improvement and Geosynthetics*, Bangkok, Thailand, pp.232-250.
- 19) Horpibulsuk, S. (2002), "Analysis of compressibility of cement admixed clays", *International Symposium on Lowland Technology*, Saga, Japan, pp.73-78.
- 20) Horpibulsuk, S., Miura, N., Nagaraj, T.S., and Koga, H. (2002), "Improvement of soft marine clays by deep mixing technique", Proc. 12<sup>th</sup> International Conference on Offshore and Polar Engineering, Kitakyushu, Japan, pp.584-591.
- 21) Horpibulsuk, S., Bergado, D.T., and Bunchai, W. (2002), "Evaluation of recharge and ground improvement using prefabricated vertical drain (PVD) for the Second Bangkok International Airport (SBIA) project", Proc. 7<sup>th</sup> Conference on Geosynthetics, Paris, France, pp.1035-1038.
- 22) Bergado, D.T., **Horpibulsuk, S.**, and Ngouchaurieng, P. (2002), "Innovative use of geosynthetics for repair of slope failures along irrigation/drainage canals on soft ground", *International Conference on Geotextile and Geosynthetics*, Paris, France, pp.147-150.
- 23) Horpibulsuk, S., and Miura, N. (2001) "A new approach for studying behavior of cement stabilized clays" 15<sup>th</sup> International Conference on Soil Mechanics and Geotechnical Engineering (ISSMGE), Istanbul, Turkey, Vol.3, pp.1759-1762.
- 24) Bergado, D.T., and Horpibulsuk, S. (2001), "Ground Improvement by PVD", Short Course on Ground Improvement using Prefabricated Vertical Drain (PVD), pp.1-21.
- 25) Bergado, D.T., Horpibulsuk, S., and Teerawattanasuk, C. (2001), "Soil Improvement by MSE Theoretical background", *Short Course on Mechanically Stabilized Earth (MSE)*, Asian Institute of Technology, Bangkok, Thailand, pp.1-26.
- 26) Horpibulsuk, S., Miura N. and Nagaraj, T.S. (2001), "Analysis and Assessment of strength development in cement admixed clays" *International Conference on Civil Engineering*, Department of Civil Engineering, Indian Institute of Science, India, Vol.2, pp.156-163.
- 27) Horpibulsuk, S., Miura, N. and Nishida, K. (2000), "Factors influencing field strength of soil-cement column" Year 2000 Geotechnics, Geotechnical Engineering Conference, Asian Institute of Technology, Bangkok, Thailand, pp.623-634.
- 28) Horpibulsuk, S., Miura, N. and Nagaraj, T.S. (2000), "The prime parameter governing the stress~strain characteristics of cement stabilized clay" 2<sup>nd</sup> Proceedings of the International Symposium on Lowland Technology, Institute of Lowland Technology, Saga University, Saga, Japan, pp.153-160.
- 29) Horpibulsuk, S., Miura, N. and Nagaraj, T.S. (2000), "A new method for predicting strength of cement stabilized clays" International Symposium on Coastal Geotechnical Engineering in Practice, *IS-Yokohama 2000*, Yokohama National University, Yokohama, Japan, pp.605-610.

http://eng.sut.ac.th





- 30) Kohgo, Y. and **Horpibulsuk, S.** (1999), "Estimation of volume change behavior of yellow soil" Highlight of Collaborative Research Activity between Thai Research Organizations and JIRCAS, *JIRCAS Seminar*, Bangkok, Thailand, pp.87-90.
- 31) Kohgo, Y and Horpibulsuk, S. (1999), "Simulation of volume change behavior of yellow soil sampled from Khon Kaen City in Northeast Thailand" 11<sup>th</sup> Asian Regional Conference on Soil Mechanics and Geotechical Engineering, Soul, Korea, pp.141-144.
- 32) Kohgo, Y. and **Horpibulsuk, S.** (1999), "Deformation analysis of a fill-type dam by using FEM consolidation analysis method" Civil and Environmental Engineering Conference, Asian Institute of Technology, Bangkok, Thailand, pp.177-186.



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Education and Competence:	197:
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- B.Eng. (Civil Engineering), Chulalongkorn University, Bangkok,
   Thailand
   M.Eng. (Civil Engineering), University of Texas at Arlington,
- Arlington, Texas, USA 983 Ph.D. (Civil Engineering), University of Texas at Arlington, Arlington, Texas, USA
- Director-Computer Center for Services, Suranaree University of Technology, Nakhon Ratchasima, Thailand
- 2. Lecturer, School of Civil Engineering, Suranaree University of Technology.

2002-Present	Director-Computer Center for Services, Suranaree University of	
	Technology, Nakhon Ratchasima, Thailand	
1995-2002	Deputy Director-Computer Center for Services, Suranaree	
	University of Technology, Nakhon Ratchasima, Thailand	
1994- Present	t Lecturer, School of Civil Engineering, Suranaree University of	
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	USA	
1987-1989	Chief Engineer, Composite Technology, Inc., Fort Worth Texas,	
	USA	
1983-1987	Engineer, Composite Technology, Inc., Fort Worth Texas, USA	

Dr. TANONGSAK BISARNSIN



# Academic and Professional Backg ounds:

Technical Reports and Fublication

Structural Engineering – Behavior and Design of Fiber-Reinforced Composite Structures, also in Computer-Aided Structural Mechanics using Finite Element Methods. Specialized in Enhanced media Instructions in Technical and Engineering Applications through Internet and Intranet. Member of American Society of Civil Engineers Structural Plastics Composites Committee. Registered as a Professional Engineer Thailand.

- Bisarnsin, T., "Predicting the Effects of Radial Keratotomy," Ph.D. Dissertation, University of Texas at Arlington, Arlington, Texas, 1983.
- Green, A., and Bisarnsin, T., "Building Construction Materials," Van Nostrand Reinhold, Advanced Thermoset Composites: Industrial and Commercial Applications, pp. 249-271, 1986.
- Huang, T, Schachar, R.A., and Bisarnsin, T., "Curvature Change Due to Radial Keratotomy," Proceedings of the International Conference of Finite Element Methods, Gordon and Burach, Science Publishers, Inc., NewYork, 1988.
- Huang, T., Schachar, R.A., and Bisarnsin, T., and Black, T.D., "Corneal Curvature Change Due to Structural Alteratiion by Radial Keratotomy," Transactions of The ASME, Journal of Biomechanical Engineering, Volume 110, August 1988.
- Green, A., and Bisarnsin, T., "Predicting the Performance of Composites Experimentally," Managing Corrosion with Plastics, Volume IX, The National Association of Corrosion Engineers, 1988.
- Yuan, R.L., Hashem,Z., Green, A., and Bisarnsin, T., "Fiber-Reinforced Plastic Composite Columns," Proceedings of the ASCE Special Conference: Advanced Composites Materials in Civil Engineering Structures, 1991.
- Green, A., and Bisarnsin, T., and Love, E., "Pultruded Reinforced Plastics for Civil Engineering Structural Applications," 47<sup>th</sup> Annual Conference, The Society of Plastic Industry, 1992.
- Love, E., and Bisarnsin, T., "Experimental Investigation of Self-Tapping Fasteners to Pultruded Fiber-Reinforced Plastics Beams," Proceedings of the Material Congress, ASCE. 1992.
- Green, A., Bisarnsin, T., and Love, E., "Pultruded Reinforced Plastics for Civil Engineering Structural Applications," Journal of Reinforced Plastics and Composites, October 1994.



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1998	M. Eng. (Geotechnical Engineering), AIT.
2005	D.Eng. (Civil Engineering), Graz University of Technology (TUG)
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B. Eng (Civil Engineering), Khon Kaen University.

1. Lecturer, School of Civil Engineering, Suranaree University of Technology.

 1998 -2002 Lecturer, School of Civil Engineering, Suranaree University of Technology
 2002 Member in investigatory building settlement committee, Suranaree University of Technology
 2002 – 2005 Research assistant, Institute for Soil Mechanics and Foundation Engineering, Graz University of Technology.

2005 – Present Lecturer, School of Civil Engineering, Suranaree University of Execution, Suranaree University of Technology.



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1996		Second Class Honor, Khon Kaen University
1996-1998		Partial Scholarship, Asian Institute of Technology
2002-2005		Scholarship award technology grant Southeast Asia (Doctoral
	¥.	Program) from Austrian Council for Research and Technology
		Development Austrian
2004		Best poster award in ITA-AITES 2004 World Tunnel Congress,
		Singapore



(2) Scheid, Y., Chinkulkijniwat, A., Semprich, S., Numerical Simulation of Air Loss during Tunnel Advance in Compressed Air Tunnelling, Unsaturated



Professional Associatio

Soil, Proc. Int. Conf. "From Experimental Evidence towards Numerical Modeling of Unsaturated Soils", Bauhaus-University Weimar, Germany, September 18-19, 2003, Vol. 2, 289-304.

(3) Semprich, S., Scheid, Y., Chinkulkijniwat, A., Numerical Simulation of Tunnel Advance for Compressed Air Tunnelling, Proc.30th ITA-AITES World Tunnel Congress, Singapore, May 22-27, 2004, 466-467.

(4) Chinkulkijniwat, A., Semprich, S., Steger, G., Hydraulic Parameter Estimation and Uncertainty in Using Them to Calculate the Rate of Air Flow in Compressed Air Tunnelling, Proc. 3rd Int. Sym. on Two-phase Flow Modelling and Experimentation, Pisa, Italy, September 22-24, 2004

(5) Chinkulkijniwat, A., Semprich, S., Steger, G., Unsaturated Hydraulic Properties for Compressed Air Tunnelling by Inverse Modeling, Proc.16th Int. Conf. on Soil Mechanics and Geotechnical Engineering, Osaka, Japan, September 12-16, 2005 (in printed).

(6) Chinkulkijniwat, A., Determination of Unsaturated Hydraulic Properties for Compressed Air – Inversion of The Experiment, 7th GEO-DACH Treffen, Graz-Reinischkogel, Austria, 9-11 June, 2005 (in printed)

(7) Steger, G., Semprich, S., Chinkulkijniwat, A., Recent Advances and Encountered Problems in Computing Air Losses in Compressed Air Tunnelling by Consideration of Unsaturated Soil Mechanics, 4th International Conference on Unsaturated Soils, Phoenix, Arizona, USA, April 2-5, 2006 (accepted to be published)

1996 Associate Civil Engineer, Council of Engineers

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