

## • Department of Architectural Engineering

### 1. Educational Goal

- ① Cultivating specialized theories and practical knowledge about major fields of studies
- ② Elevating comprehensive and balanced thinking skills by collaborating with other fields
- ③ Conceiving leadership as professionals

### 2. Educational Objective

#### 1) Enhancement

Cultivate architects with structured and expertized knowledge in major fields of studies by researching and studying all necessary academical theories to lead living environment in the right direction, and carrying out implemental researches in practice

#### 2) Globalization

Cultivate rational professionals leading the future of architectural culture by providing curriculums that students find out new trends in architecture and learn specific expertise

#### 3) Localization

Cultivate architectural experts leading architecture in local areas by offering community focused programs to understand and solve architectural problems in neighborhoods

### 3. List of Full-time Faculty

Name	Position	Degree(University)	Field of Instruction	Area of Research
Kim Uk Joong	professor	Ph.D. in Engineering (Chungbuk National University)	Architectural design	Architectural design & Architectural theory
Kang In Ho	professor	Ph.D. in Engineering (Yonsei University )	Housing urban design	Housing urban design & design, Post Occupancy Evaluation Methodology
Moon Jeong Ho	Professor	Ph.D. in Engineering (University of Texas at Austin )	Architectural Structure	Reinforced concrete & Prestressed concrete structure/Nonlinear structural analysis
Han Pil Won	professor	Ph.D. in Engineering (Seoul National University )	Architectural design	Architectural design &cultural heritage, Asian architecture
Jung Sung Jin	Professor	Ph.D. in Engineering (Seoul National University )	Architectural Structure	Architectural structural design & Structural analysis
Kwak Ro Yeul	Professor	Ph.D. in Engineering (Hanyang University)	Building Services	Building services & Maintenance management
Jeong Jae Hoon	professor	Ph.D. in Engineering (Korea University )	Architectural design	Architectural design
Lee Jae Sung	Associate Professor	Ph.D. in Engineering (University of Colorado at Boulder)	Architectural Materials	Architectural materials and Fire –Resistant constructions
Kim Hak Rae	Associate professor	Ph.D. in Engineering (Yonsei University )	Architectural design	Housing urban design & design, Structure and Design
Shin Hyun Jun	Associate professor	Master of engineering (Yonsei University )	Architectural design	Architectural design & Eco-friendly design

## 4. Course Description

### ▣ Architectural Planning & Design

- **AE601 Architectural Design Studies I 3 credits**

High-level design process to realize finally social meaning at the function and form by integrating all of architectural conditions. Aiming at improve the intelligence and the expression capability of concrete form and space in the design process as architect. At the given site of 30M x 30M designing a two floor library for 20,000 peoples of small city under the fundamental condition of following the modern spatial composition principles such as continuity, flexibility and changeability by using several modern architectural elements such as column, separating wall, natural light etc.

- **AE602 Architectural Design Studies II 3 credits**

Researching the architectural solutions screened by social and spatial structural logic in facing the contemporary urban spaces. Defining public spaces, specially recognizing that organizing complex spaces quality condition every scale of social life and understanding the presence of building facilities as well as the mechanics of building appearance. By thus typological research, defining no more "standard" than harmonization among housing inner conditions as urban fabric. In order to basically spatial relations prohibiting the addition of any recognizable architectural elements, modelling step by step beginning from 1/2000 to 1/500 scale concrete planning.

- **AE603 Computer Application in Architecture 3 credits**

This course is to understand the architectural design process and increase the ability of computer application design. Main contents is to explore recent architecture design methodology and design process through the results of cognitive science research. And students use of CAD, or knowledge-based learning practices and techniques. This subject is composed of lectures and exercise classes. and it is focused on the ability of practical adaptive skills through exercises.

- **AE604 Theory of Architecture I 3 credits**

By reviewing various theoretica systems defining architecture understanding the influence and role of architectural theory facing to design problems. Discussing relations or differences between architecture theories and his rooted general theories based upon understanding interdisciplinary stimulating roles and characteristics.

- **AE605 Theory of Architecture II 3 credits**

Increasing capability of interpretations at the conceptual and integrative levels by surveying various viewing points of reading architecture such as historical

backgrounds, philosophical reflexion aspects. Focusing on historical overview but keeping standing point of practical design is distinctive to the architectural history. Principal issues such as debate between old and new, style and composition, environmental theory and esthetic theory will be developed.

• **AE606 Theory of Architectural Composition I 3 credits**

Researching principles of regulating morphologically essential elements of space and form under the given environment. Classifying the basic form, spatial organization, the general transformation and sampling concerned cases, furthermore reasoning autonomic rules and conditions needed on the formal, spatial design. Choosing several themes and defining the meanings, analyzing how to be applied and to be developed by the alternative design.

• **AE607 Theory of Architectural Composition II 3 credits**

Focused upon the practical performance of architectural work, improving the abilities of interpretation and application about architectural works. Developing the personally chosen theme of Theory of Architectural Composition I. Given the general program, relating personal theme to the start point of design problem solving. Even though the theme is commonly treated, understanding of various approaching methods concluded particular as result because of different composition concepts among them.

• **AE608 Design Programming 3 credits**

Study of definition and function of programming approaches to meet user needs in design projects ; Based on the study of programming methods and data analysis, seeking the systematic approaches to design works. Main contents are as follows ; decision making in design, design methods, programming techniques such as dimension and space programming, documentation and case studies, post-occupancy evaluation method.

• **AE609 Studies in Korean Architecture 3 credits**

This course deals with the historical development and characteristics of the Korean Architecture. In this course, the meaning and interpretation of the Korean Architecture are explored rather than its styles. The identity and future potential of the traditional Korean Architecture are also explored in order to deal with the issue of tradition in contemporary architectural practice. The traditional thoughts and theories on architecture are lectured, and their typical embodiments are analyzed. This course consists of audio-visual lecture, seminar and field survey.

• **AE610 Studies in Oriental Architecture 3 credits**

This course mainly explores the study methodologies of architectural history with reference to traditional dwelling architecture of Asia. In this course, the courtyard house types evolved in diverse cultures are typified, and interpreted

cross-culturally. The objectives of this course are as follows:

- 1) the understanding of the courtyard house type: spatial elements and organizations, historical development
- 2) the comparative study of similar types
- 3) the cross-cultural definition and interpretation of courtyard house types

• **AE611 Studies in Western Architecture 3 credits**

From the viewpoint on architecture as the result of historical situation, topography, geography and climate, the issues on western architecture are reviewed regionally and historically. The critical historical changes, from the primitive age to the end of the 19th century, or before the rise of modern architecture, are comparatively studied in terms of the central thoughts and their embodiments. The course consists of lecture and seminar in which students present their topics.

• **AE612 Studies in Modern Architecture 3 credits**

This class is to understand today's architectural changes and analyze it based on a variety of architectural theory. Main contents is to explore the relationship between the theory and their impact on contemporary architecture through today's architecture appears as a result of theory. we also discuss today architectural history for the prediction. The object of this class is contemporary architecture since the 20th century. This class is taught in the lectures and seminars. Students in the seminar select each of the two topics and survey, and discuss with the presentation. The lecture will be performed using video and slides.

• **AE613 Advanced Studies of Environments in Buildings 3 credits**

This course studies the science of those services that contribute to the environment which exists in and around buildings. The main topics are heating, lighting and sound in buildings; and the supply of electricity and water to buildings.

Also this course is intended for students of buildings, civil engineering and surveying who are studying environmental science. Environmental control methods are divided passive(natural) and active(mechanical) method: Underground course focus on passive, but this level-up course laid emphasis on active method which needs energy. This course goes on experiments and seminars.

• **AE614 Advanced Design & Planning of Housing 3 credits**

Introduction to theory and applications of housing design. investigation to the relationships between user needs and housing design, socio-economic properties and housing production system. especially the course is based on the housing cases both of domestic and abroad, and is proceeded by seminars and lectures.

- **AE615 Post- Occupancy Evaluation Research 3 credits**

Introduction to the theoretical background and techniques of Post-Occupancy evaluation research. In terms of design applicability, relationships and gaps between research paradigm and design paradigm is investigated ; survey methods, data analysis by both quantitative and qualitative methods ; spss package ; case evaluation study

- **AE616 Survey and Analysis Method 3 credits**

Theory and practice of Survey and Analysis in design. Quantitative and qualitative survey and analysis techniques are composed of the course. In quantitative methods, statistical analysis techniques is proceeded by sample data in spss package. main goal is to make the data analysis results applicable information to design process.

- **AE617 Housing Development Policy 3 credits**

Introduction to housing policy. the process and system of policy making based on the anticipating the housing demands and supply capacity of government. Influence and impact of housing policy to the housing design ; analysis of housing market, construction cost, financial condition by using the current data. History of Korea housing policy in past also studied.

- **AE618 Renovation & Redevelopment of Urban Area 3 credits**

Introduction to the regeneration and redevelopment of urban area. History of redevelopment and regeneration in Korea ; Problems of redevelopment and necessity of the concepts of regeneration in terms of inhabitants. Law and regulation system concerning to redevelopments and regeneration. Land use, Traffic system, zoning resolution, density control ;

- **AE619 Urban Infrastructure 3 credits**

Understanding the urban infrastructures relating the urban planning and design. relationships between urban infrastructures and architectural practices. planning methods of the public facilities and case analysis of new town ; the role of public sector in supplying the urban infrastructures ; function of urban infrastructures to the architectural practices.

- **AE620 Studies in Urban Design 3 credits**

Defintion, history, and process of urban design. the role of urban design in terms of linkage of urban space and architecture ; understanding the integrative property of urban design and case studies. Laws and regulation system of urban design of korean and foreign countries, District planning system of Japan and B-plan system of Germany, Zac system of France. One case site is analysed focused on the district unit planning.

- **AE701 Studies of Public Facilities in Housing Area 3 credits**

The important factors in housing area are roads, parking lots, parks, children's playground, shops, senior halls, and buildings such as town hall. It must be secured housing as well as the proper location and size of these public facilities for comfortable environment and promote the welfare of residents. And it should be a prerequisite the composition of the physical environment for the sound development of local communities. Therefore, students will examine improvements in housing area design through a variety of techniques.

- **AE702 Evaluation of Housing Project 3 credits**

The development of appropriate evaluation criteria is very important to evaluate how effective is the goal of housing projects been carried out. The materialization of the goal and its evaluation process to measure whether it been achieved is done by selecting the measurement indicators. The six stages of evaluation is questions for the evaluation, setting efficiency standards, assessment plan participant's decisions, data collection, analysis, reporting and so on. This course will be lectured by concentrating the previous three steps.

- **AE703 Studies in Modern Housing of the Western 3 credits**

Introduction to history of western housing design. Main stream of housing design from industrial revolution to present focused on the design paradigm. relationship between past history and present housing design trends ; main study objects is on the Europe - British, Germany, France and the Netherlands. the scope compasses the units design to regional planning. Understanding the Korean housing by comparative perspectives.

- **AE704 Studies in Modern Housing of Korea 3 credits**

Introduction to history of Korea housing design. Main stream of housing design from 1940s to present focused on the design paradigm. relationship between past history and present housing design trends ; main study objects is on the collective housing. the scope compasses the units design to regional planning. Understanding the Korean housing by comparative study on the influences and impacts of western housing.

- **AE705 Studies in New Town 3 credits**

The planning logics and methods of New Town and 'town in town' are explored. This course deals with both the domestic and foreign cases, especially those in European countries including United Kingdom that have led New Town planning, and Japan having similar situation with Korea. This course also deals with Korean industrial city plannings that are regarded as the beginning of New Town planning in Korea, though it mainly explores the methodologies for spatial organization and underlying paradigms on living space with reference to the residential New Towns. Domestic cases are also surveyed and studied. The course aims to improve the understanding of urban spatial structure based on the interpretation on urbanism.

- **AE706 Architectural Criticism 3 credits**

Given the architectural design is resulted by the intellectual thinking process of architect, the architecture can be thought as the result reflecting cultural phenomena interpreted by architect. The architecture is regarded as the container of intentions, and architectural criticism as the interpretation of such meanings gets productive for critical reflection and prospect on design by examining the phenomena in resulted architecture. The course mainly deals with the diverse methodologies of architectural criticism in terms of the interpretation of meanings, reviews the cases of criticism with different viewpoints, and practices criticism.

- **AE707 Architectural Essay 3 credits**

Architects should work to easily understood and to allow access their architecture for the public who is potential clients. To do so, students should understand the essence of a phenomenon that is easily found in everyday life. And the students is needed training to describe it as a plain writing style. Through this process, ultimately the students choose their own topics about architecture, write an essay, and so contribute to the media.

- **AE708 Architecture and Culture 3 credits**

According to architectural history, architecture sometimes is a dominant culture of the era to give a new impact drivers, but in some cases, it occurs a new turning point of architecture under the overall influence of the other areas.

The cultural phenomenon are reflected on the architecture is very complex and diverse. Therefore, it is indispensable for understanding the cultural aspects in order to the correct understanding and interpretation of the architecture. The main contents of this class is to explore the relationship between art, literature, sculpture, painting, theater, dance and architecture as well as to examine the relationship political, social, economic and architecture

- **AE709 Studies in Asian Architecture 3 credits**

With reference to the architectures in China and Japan that have historically exchanged architectural culture with Korea, this course explores the common and different aspects in East Asian architecture. Through the comparative study of Chinese and Japanese architectures synchronically and diachronically, such common and different aspects are revealed. The course consists of three small topics: firstly, the understanding of unique ideas on architecture and space in the two countries through literature study, secondly, the grasp of the development of the architectural characteristics over historical process with reference to specific building types, and thirdly, the exploration on the patterns in which the historical context and tradition are expressed in contemporary architecture in the two countries.

- **AE710 Studies in Urban Architecture 3 credits**

Currently most of the architectural activities are practiced in urban tissues. When the urban architecture is defined as the architecture responding urban tissue with appropriate logics, the task in architectural field is to make desirable urban architecture. This course reviews the theoretical backgrounds on which urban architectures are realized, and critically explores the methodologies for diverse types of urban architecture. The showcases of urban architecture are also analyzed and discussed.

- **AE711 Contemporary Housing Design 3 credits**

This course explores the directions of dwelling architecture appropriate to Korea's reality. For this objective, the requirements of contemporary housing are derived from the spatial and social diagnosis on Korea's reality in housing. And practical methods of housing design are examined referring to domestic and foreign showcases especially in terms of technology including structures and materials. The final result of this course is the design solutions in real sites meeting the derived design requirements.

- **AE712 Advanced Studies of Eco-friendly Equipment for Buildings 3 credits**

Eco-friendly approach for building's facilities are need nowadays. Global warming, depletion of non-renewable natural resources, and urban sprawl have become global challenges. Decades of poor planning, inconsiderate energy-disregarding building practices, and overconsumption of goods have done little to reverse course in the building environment. This course is about the steps that need to be taken to alter the course. Also intend to understanding the topic and to gain abilities of solving problems.

- **AE713 Climate Studies for Buildings 3 credits**

One of the earliest reasons for buildings was to create shelter from the climate; to enhance thermal comfort. This course introduces this interrelationship between bodies, buildings, and climate by discussing bodily heat flow, then thermal comfort, then the design strategies that are appropriate to various climates. The final topic is the role of building skin elements as they change the outside climate to the one inside. We study the basic theories by lectures and intend to acquire practical application abilities by seminars and experiments.

- **AE714 Energy Design for Buildings 3 credits**

This course studies the fuel and resource relationship to buildings, from design to demolition. Secondly, goes on human comfort, the variety of conditions that seen "comfortable," and some implications for building design of a more broadly defined "comfortable zone." Finally we encourage a view of building site as a collection of a renewable resources, to be used and shared in the lighting,

heating, and cooling of buildings. The course goes on field experiments and seminars.

- **AE715 Architectural Planning and Marketing 3 credits**

It is being changed rapidly the environment of architecture market and the role of architects in realistic conditions. Therefore, the necessary skills and requirements for the architect is also being changed. The purpose of this course is to improve the planning and marketing skills that is required for the architect of a new era. More specifically, it is deals with the feasibility analysis and a variety of decision-making that is required to achieve business goals through the project of architecture. In addition, students will study the marketing strategy that is needed for the architect to realize the project.

- **AE716 Advanced Studies of Housing Design 3 credits**

Advanced study on the housing design theory and practice. Practical capability is emphasized in the course. Main topics are as follows ; community and privacy, productivity and individuality, open space and housing blocks, circulation system and pedestrian space system, integration of each design elements.

- **AE717 Comparative Studies of Architecture 3 credits**

If the architectural space have inherent cultural characteristics, it is means that has its own internal principles of spatial composition or configuration. However, it is difficult to analyze the characteristics of the modern architectural space of Korea that received much influenced by Western modern. Therefore, it is useful how to identify the spatial characteristics of the domestic architectural space compared with Western architectural space. It is very important the comparative study as a way of checking the universality and particularity of the architectural space. Through this study, students can improve the skills to the configuration of architectural space that is based on culture.

- **AE718 Architectural Alternative Energies 3 credits**

Industrial societies use too many virgin resources and degrade the environment in many ways. The ability to protect the environment resides in the effective management of resources that can be replenished or reused, and in the efficient use of those that cannot. Our architectural environment needs renewable sources: tidal, solar, geothermal, biomass, wind, hydroelectric etc.. This course studies the possibilities of adapting those renewable energies to buildings. The course goes on field experiments and seminars.

- **AE719 Technology and Architectural Design 3 credits**

In the design process of the concept of architecture is translated into concrete space and form, it can be narrowed significantly the design area when the complex problems of materials, structures, construction technology to regard

only as a simple functional response task. When you analyze the case of main buildings in focus of architectural engineer aspects, we can be viewed the organic correlation between the technical conditions and cutting-edge contemporary design in the process of creating a new architectural style. It is easy to ignore the relationship between the two in today's architectural design which is based specialization and segmentation. can be a valuable endeavor. Therefore, it can be a valuable endeavor that is actively explore technology-oriented design.

- **AE720 Architecture & Society 3 credits**

Architecture are interacted with the various social phenomena. While it may be understood that as architecture and social phenomena are independent interaction, on the other hand we can look at it as the different expression of cultural phenomena. In this course, architecture is explored as a form of the social phenomenon, and through this, students can understand of the interaction of the architecture and social phenomena.

- **AE721 Multimedia as a Means to Architecture 3 credits**

The tools in architectural planning, design and presentation are becoming very diverse due to the development of computer technology. Especially multimedia, in the target of client and public as well as the architectural planning and design process, began to occupy an important role in presentations. This course covers a variety of ways to take advantage of multimedia for architectural planning, design and presentation.

## ■ **Architectural Structure & construction Materials, Service**

- **AE621 Matrix Analysis of Structure 3 credits**

This lecture studies methods to prepare computer programs using matrix when analyzing structures. They apply to the frame analysis that connects to beam and column members mainly during the structural linear analysis, Understand differences between stiffness and ductility method. Compare with the existing program results by analyzing simple examples after preparing frame structure analysis programs using stiffness method. It will be studied to consider special cases such as truss explanation, tapered beam element, and node release. Explain hand calculation analysis methods on other simple indeterminate structures.

- **AE622 Design of Steel Structures 3 credits**

This lecture studies structural design methods using ASD and LRFD. Study design principles such as loads, combination of loads, and load factors. Understand usability limit state design and design requirements. Exercise to design through structure analysis on tension, compression, bending members as structural member designs. It will be studied on details of welding, joint, pillar,

beam junctions as junction design.

- **AE623 Behavior of Reinforced Concrete 3 credits**

This lecture studies theoretical backgrounds on concrete behavior that becomes concrete structural design standards. It will be studied for utilization methods on the relationship between stress and deformation of the steels and concretes. Understand the most basic calculation methodology on the strength of flexural members, and study about members that receive bending and axial force.

- **AE624 Fundamentals of Building Energy 3 credits**

Since various energies are being used to ensure comfort and productivity of people who use the building, study to effectively reduce energies used in buildings and ways to efficiently use them by clearly understanding characteristics of the energy used in buildings. In addition, it will be studied about recently emerging applicability of energy feedback to the practical use.

- **AE625 Plastic Design of Steel Structures 3 credits**

This lecture studies the optimal use of steel sections, best usage methods for material properties on members, and methods to accurately predict structure behaviors in extreme conditions. Understand material modeling methods used during material designs, and study methods used in structural members. It will be studied about methods to calculate maximum strength using various collapse mechanism, and understand upper bound, lower bound theorem, and unique suspension. It will be studied how plastic design on steel structures can be used in concrete slab and extreme strength analysis.

- **AE626 Structural Dynamics I 3 credits**

This lecture studies basic dynamic properties and analysis methods for first degree of freedom structures. It will be studied on methods to explain each structure's free vibration, harmonious motion, periodic load, and impact loads. Understand principle of superposition and study about DFT, FFT. Fourier response integration, and numerical analysis method.

- **AE627 Structural Dynamics II 3 credits**

This lecture research behavior of structures at the time of earthquake load. Simple application of time history analysis method to 1st degree of freedom structures. Research on dynamic characteristics and analysis methods to 2nd and multidimensional degree of freedom structures. Application of superposition to the dynamic analysis, and explanation of earthquake engineering overview using dynamic theory.

- **AE628 Principles of Structural Stability 3 credits**

This lecture studies on buckling of columns using general principles of structural stability theory. Research methods of interpretation on the

momentum and inelastic regarding various boundary conditions of pillars. Interpret uniformly loaded members under axial force, members subjected to the moment and axial force using column-beam theory. Find buckling load using finite difference method and slope deflection method with simple structure model.

- **AE629 Finite Element Method in Structural Engineering I 3 credits**

This lecture studies to understand basic concept of elastic theories and basic principles applied to finite element methods. Explain program preparation tips through truss members which are simplest finite elements, plus development methods as beam elements. Induce strength characteristics of continuum finite elements, and explanation of simple application examples. Describe triangular, rectangular, tube bending finite elements, and execute computer analysis utilizing analysis programs with example models.

- **AE630 Advanced Materials for Building 3 credits**

This course studies physical and mechanical properties of steel, concrete, asphalt and fiber reinforced polymers. Also, explain the internal structures of materials at micro and nano level. The testing procedures for construction materials are examined.

- **AE631 Advanced Mechanics of Materials I 3 credits**

Advanced Mechanics of Materials I deals with theoretical concepts of materials in great depth which were covered in undergraduate school. Study theoretical concepts such as compatibility conditions, constitutive equations, equilibrium conditions, classical theories on torsion and bending and 3-axis strain-stress relations.

- **AE632 Theory of Elasticity 3 credits**

This lecture studies to understand Hooke's law and stress-strain concept. In addition, understand and induce equations on plane stress and plane strain. It will be studied about elastic analysis method of cantilevers and beams in 2 dimensional cartesian coordinate system. Further, study structural analysis methods due to various boundary conditions from 2 dimensional polar coordinates.

- **AE633 Project Management Tools and techniques 3 credits**

This course provides various project management tool& techniques for planning, executing and controlling a construction project. For each tools and techniques, student will learn definition, when to use and how to use. Through this course, students will be able to have a fundamental knowledge for each knowledge area and tools and techniques for those fields.

- **AE634 Construction Cost Management 3 credits**

Cost management is one of essential elements in construction project management. This course will focus on cost planning and management for construction project by covering such topics as economic analysis, various cost estimating and controlling methods.

- **AE635 Principles of Fire Engineering 3 credits**

This course studies engineering approaches (general principles and concepts related to the fire) on the fire safety in buildings including engineering methods to prevent loss of life. In addition, study fire regulations for domestic and other countries, and fire resistance methods on structural elements such as columns and beams.

- **AE636 Building Service Advanced Maintenance Management Technology 3 credits**

Buildings have a long-term life cycle, and considering the life cycle costs, maintenance management is being increasingly emphasized. In this course, it will study applied technologies and advanced management practices from facility management and building energy management system (BEMS), and basic theories such as reliability theory, preventive maintenance theory, and life cycle cost evaluation, which are maintenance theories that can enhance performances of the building facilities, reduce life cycle costs, and as methods to extend life of equipments. In addition, it will evaluate systematization of maintenance technologies and quantitative effects due to the advancements, and study to carry out effective maintenance strategies.

- **AE637 Solar Energy Technology 3 credits**

In order to conserve energy and implement sustainable building, it is required to have precise understanding and practice steps on passive designs and active control techniques. By understanding basic theories and principles on passive and active types of solar heat and energy systems which are the closest to practical steps in reality, it will realize utilization methods in facility planning and design for the solar energy technology by studying international building cases.

- **AE638 Advanced Topics on Sustainable Building & Services 3 credits**

Based on the understanding of environmental engineering characteristics of buildings, implement equipment systems that can satisfy various environmental performances. Also, study environmentally friendly facility technologies that can achieve energy preservation and conservation of the earth environment which are becoming important considerations in engineering works such as facility design and construction, not limited to the architectural planning and designs. In addition, identify basic theories and principles on energy conservation equipment technologies, environmental friendly equipment technologies, and energy management technologies for buildings, such as high-efficiency energy equipment technologies, recycling technologies, environmental load reduction

technologies, alternative energies, and to master utilization methods for facility planning and design by studying on the international building cases.

- **AE639 Advanced Mechanics Materials II 3 credits**

In Advanced Mechanics Materials II, It will understand general principles of fracture mechanics and structural stability theories, and bucking of columns including mechanical properties of composite materials.

- **AE640 Construction Productivity 3 credits**

This course will focus mainly two parts. First part is how to measure and analysis construction productivity. Second part will focus on identifying factors affecting construction productivity for each phase, and methods for improvement productivity in terms of project, task and labor.

- **AE722 Inelastic Behavior of Materials 3 credits**

From the composite stress condition, information will be acquired regarding inelastic behavior of materials. First, basic contents such as stress and deformation in 3-dimensional spaces are dealt. Then, contents on stress-strain relations, perfectly plastic solids, and work-hardening plastic solids will be studied. In addition, contents related to the functioning of the finite element methods by J2-theory will be dealt. Moreover, bounding surface theory will be dealt from cyclic loading conditioned structural steels. Also, failure surfaces and constitutive relations due to concrete's inelastic behaviors will be studied. In addition, it tries to deal with the applicability to the computer by modeling inelastic characteristics of materials as above. Finally, it tries to combine theory with practical application in parallel through the existing inelastic program utilization.

- **AE723 Design of Prestressed Concrete Structures 3 credits**

It will acquire necessary fundamental knowledges for PS (Prestressed) concrete structures, and analysis skills for member and design method. First, it should understand basic concepts on PS concrete structures, and study characteristics of utilization materials. Then, it deals with behaviors of bending members, and designs bending members based on strength design methods. By utilizing strain compatibility methods, it will study how to calculate moment-curvature relationships. For the behaviors and designs on shear forces, it will be based on ACI designs and MCT (Modified compression theories) in accord with truss theories. In addition, it will deal with the loss of tensions and consequent design methods, and will study on load-balancing methods for the designs such as continuous beams or slabs.

- **AE724 Advanced Structural Analysis 3 credits**

In general, structural analysis using computer have advantages to obtain exact results in a short time period, but it easily can have high possibility in lack of

information as for the basis on structural analysis such as necessary information due to lack of understanding in the middle stage. Therefore, this course mainly tries to deal with the contents that can be covered. It studies methods to analyse various shapes of structures using flexibility method and stiffness method. First, it deals with the basic information on interpretation methods, and apply various types of structures. Also, by studying connectivity of energy laws and moment distribution methods, it tries to acquire various analysis methods together with overall contents on structure analysis.

• **AE725 Building Energy Management System 3 credits**

Building Energy Management System (BEMS) is studied a way to optimize indoor environment and energy performance. Based on building equipments such as air conditioning, sanitation, electricity, lighting facilities, fire prevention equipments and security equipments, detailed training is made on indoor environment, monitoring of equipments' operation situation, operation management, automatic control through various sensors and measurements. In addition, it studies energy environmental management function, equipment management support, and facility management support functions which are components of BEMS.

• **AE726 Topics on Construction Management 3 credits**

This course is advanced course in the field of construction engineering and management. By analyzing the latest paper in the field of construction engineering and management, students will be able to catch a trend and of research and issues for each topics.

**Research for the Master's Degree I 0 credits**

**Research for the Master's Degree II 0 credits**

**Research for the Doctoral Degree I 0 credits**

**Research for the Doctoral Degree II 0 credits**

**Research for the Doctoral Degree III 0 credits**