DEPARTMENT OF ARCHITECTURE

Chairman

Dr. Adel S. Aldosary

Faculty

Al-Abbad	Al-Najjar	Ibrahim
Abdelfattah	Al-Qawasmi	Javed
Alkharoubi	Ashmeel	Zami
Al-Mahdi	Delledonne	

The Department of Architecture, in the College of Environmental Design at KFUPM, has a well-established Bachelor of Architecture (B. Arch.) program. The quality of this broad-based curriculum is substantiated by the success of its graduates and alumni in the Saudi Arabian workforce. In order to further enhance the strength of this program, a Master of Science in Architecture (MS) program has been designed in order to allow more in-depth inquiry of topics critical to today's built environment and that of the future. The initiative came out of the need for well-trained architects to cope with the increasing complexity in the building industry, and to respond to the increased demand for well-trained and specialized architects in the Kingdom. The Master of Science in Architecture program offers specialization in two areas of concentration: (1) Sustainable Architecture and (2) Advanced Design Studies. In addition, the graduate program allows for a wide selection of graduate courses and research activities that will engage the student with current issues in architecture aligned with Saudi Arabia's stated goals in Vision 2030.

Admission Requirements

Admission to the program requires fulfilling all KFUPM and Graduate Studies requirements. In addition, the applicant must have a first professional degree in architecture (B. Arch) or a B.S. in architecture from a program equivalent in length, content and quality to B. Arch. program at KFUPM.

MASTER OF SCIENCE IN ARICHITECTURE

(Thesis Option)

Degree Requirements

(a) Core Courses (15 credit hours)		Credit Hours
Research Methods in Architecture	ARC 500	3
Fundamentals of Sustainable Architecture	ARC 501	3
Integrative Processes in Design and Building Delivery	ARC 502	3
Graduate Seminar	ARC 599	0
MS Thesis	ARC 610	6

(b) Elective Courses (15 credit hours)		
Three ARC Elective Courses from concentration area	ARC 5xx	9
One Approved Technical Elective Course	XXX 5xx	3
One Approved ARC or Technical Elective Course	ARC 5xx / XXX xxx	3

Concentration Areas:

Area I (Sustainable Architecture): ARC 510, 511, 512, 513, 514, 515, 516, 517, 518, 590
Area II (Advanced Design Studies): ARC 530, 531, 532, 533, 534, 535, 536, 537, 538, 591

Degree Plan

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
First Year									
ARC 500	Research Methods in Architecture	3	0	3	ARC 502	Integ. Proc. in Design & Build. Delivery	3	0	3
ARC 501	Fundamentals of Sustainable Architecture	3	0	3	ARC 5xx	ARC Elective II	3	0	3
ARC 5xx	ARC Elective I	3	0	3	ARC 5xx	ARC Elective III	3	0	3
					ARC 599	Graduate Seminar	1	0	0
		9	**0**	**9**			**10**	**0**	**9**
Second Year									
XXX xxx	ARC or Technical Elective	3	0	3	ARC 610	Thesis	0	0	6
XXX 5xx	Technical Elective	3	0	3					
ARC 610	Thesis	0	0	IP					
		6	**0**	**6**			**0**	**0**	**6**
Total credit hours required in Degree Program : 30									

MASTER OF SCIENCE IN ARICHITECTURE
(Non-Thesis Option)

Degree Requirements

(a) Core Courses (12 credit hours)		Credit Hours
Research Methods in Architecture	ARC 500	3
Fundamentals of Sustainable Architecture	ARC 501	3
Integrative Processes in Design and Building Delivery	ARC 502	3
Graduate Seminar	ARC 599	0
Master Design Project	ARC 600	3

(b) Elective Courses (21 credit hours)		
Four ARC Elective Courses from concentration area	ARC 5xx	12
Master Design Studio A or B (based on area)	ARC 518 or 538	3
One Business Elective Course	MGT 511or 512	3
One Approved ARC or Technical Elective Course	ARC 5xx / XXX xxx	3

Concentration Areas:

Area I (Sustainable Architecture): ARC 510, 511, 512, 513, 514, 515, 516, 517, 518, 590
Area II (Advanced Design Studies): ARC 530, 531, 532, 533, 534, 535, 536, 537, 538, 591

Degree Plan

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
First Year									
ARC 500	Research Methods in Architecture	3	0	3	ARC 502	Integ. Proc. in Design & Build. Delivery	3	0	3
ARC 501	Fundamentals of Sustainable Architecture	3	0	3	ARC 5xx	ARC Elective II	3	0	3
ARC 5xx	ARC Elective I	3	0	3	ARC 5xx	ARC Elective III	3	0	3
					ARC 599	Graduate Seminar	1	0	0
		9	**0**	**9**			**10**	**0**	**9**
Second Year									
ARC 5xx	Master Design Studio A or B	1	4	3	ARC 600	Master Design Project	1	4	3
XXX xxx	ARC or Technical Elective	3	0	3	ARC 5xx	ARC Elective IV	3	0	3
MGT xxx	Business Elective	3	0	3					
		7	**4**	**9**			**4**	**4**	**6**
Total credit hours required in Degree Program : 33									

ARCHITECTURAL ENGINEERING

ARC 500 Research Methods in Architecture (3-0-3)
The first part of this course aims at introducing the main concepts related to research with reference to the discipline of architecture. This includes data collection methods that are common in architecture such as questionnaire survey, interviews, observation, focus groups, contextual inquiry, and parametric analysis. It also examines issues such as research methods, triangulation of methods, problem statement, research objectives, variables and scales, and citing of references. The second part of the course examines qualitative and quantitative data analysis and introduces the main concepts and methods of computerized statistical data analysis.
Prerequisite: Graduating Standing

ARC 501 Fundamentals of Sustainable Architecture (3-0-3)
This course investigates the basic principles, theories and practices of sustainable architecture and design with emphasis on contemporary approaches. The course introduces the three core dimensions of sustainable development (i.e. social, economic and environmental) as they apply to the built environment. The impacts of buildings on the various dimensions of sustainability are examined in details. The various dimensions of sustainable buildings and relevant principles and theories are also discussed with focus on sustainable contemporary design principles. This includes the impact of buildings on site, energy and emissions, material and resources, indoor environmental quality, health and well-being, among others.
Prerequisite: Graduating Standing

ARC 502 Integrative Processes in Design and Building Delivery (3-0-3)
This course examines integrative processes as they relate to contemporary operations in the design and building industry practices. The integrative process requires collaboration among design professionals and key stakeholders (i.e. owner, architect, engineers, consultants, contractor, etc) from the planning and conception phase of an architectural project to its completion to optimize the design and final product results, increase value to the owner, and maximize efficiency. The course examines and analyzes methods, approaches, patterns of information flows, and benefits of integrative processes in contemporary architectural design and the delivery of buildings, as well as its impact on architectural design business models, structures and practices. The role of Building Information Modeling (BIM) and other computing resources in facilitating and enabling integrative processes and sharing building information across disciplines in contemporary design and construction practices is also examined.
Prerequisite: Graduating Standing

ARC 510 Energy-Efficient Buildings (3-0-3)
This course introduces the concept of comprised energy analysis for design and efficiency, and it's important in the design process both in the conceptual and detailed stages. It highlights the concept of thermal zones, modelling parameters and engines, assessing heating and cooling load analysis, occupancy protocols, outputs analysis, and modelling-based design decisions to improve thermal comfort in buildings. The course includes lab sessions to practice the above-mentioned concepts using different computerized modeling techniques. Technology of passive solar design strategies and renewable energy use are also examined.

Prerequisite: Graduating Standing

ARC 511 Materials for High Performing Green Buildings (3-0-3)
The course examines the complex issues related to material selection, fabrication, construction and deconstruction processes in the production of high performance sustainable architecture. The course provides specialized knowledge and tools needed to assess the impact of selecting and using construction materials and assemblies on the environment, and performance of green buildings. It investigates issues such as selection of green and environmentally responsible materials, life cycle costing and assessment of materials, material conservation and reduction, flexible and re-usable structures and assemblies, material waste management and recycling, indoor water use reduction. The issues examined in this course are limited only to buildings and their sites. Relevant sustainability indictors and categories from some of the renowned sustainability assessment systems will be reviewed.
Prerequisite: ARC 501

ARC 512 Quality of Indoor Architectural Spaces (3-0-3)
This course focuses on the quality of indoor spaces and how they support user's activities, comfort and well-being. Through case studies, the students will examine thermal, visual and acoustic environmental theoretical principles and practical application. The course analyses in depth the qualities of indoor architectural spaces such as ventilation and indoor air quality, thermal and humidity comfort, lighting and visual comfort, appropriate acoustical qualities, accessibility, and other qualities that support the physical and psychological well-being of occupants. It also examines the integrated and innovative approaches, technologies and systems applied to achieve such comfortable indoor environments in the Saudi context. Sustainable interior design practices are also introduced. Where appropriate computational methods are introduced.
Prerequisite: Graduating Standing

ARC 513 Architecture and Social Sustainability (3-0-3)
This course examines the social aspects of sustainable architecture and development. The course investigates the impact of architecture and urban development on various social aspects such as livability, quality of life, human health, social equity, social support, human adaptation, place-making, social responsibility, and social resilience. The course examines various frameworks used to assess, evaluate and improve the social performance of architecture and built environment. The various principles and strategies to improve social resilience, as well as the techniques used to document and analysis it will also be examined. The impact of urban conservation, adaptive reuse, gentrification and building retrofitting practices on housing accessibility, equity and social resilience will also be examined.
Prerequisite: Graduating Standing

ARC 514 Sustainable Neighborhood and Urbanism (3-0-3)
This course focuses on sustainability development attributes at the level of neighborhoods and urban areas. This course investigates/examines various innovative approaches and strategies to develop sustainable urban areas and foster smart growth strategies. This includes sensitive site design, conserve ecology and biodiversity, green land conservation,

land use, pollution of surface and ground water bodies, access to quality transit, mixed use development, walkability, compact development, access to public spaces and recreation facilities, urban heat island among others. Assessment/rating systems for sustainable neighborhood and urban sustainability are introduced and some indicators of those systems are examined. Livability, smart city, affordable housing, urban revitalization, and new urbanism are also introduced.
Prerequisite: Graduating Standing

ARC 515 Sustainable Building Assessment Systems (3-0-3)
This course examines a set of two or more well-known green building assessment systems that are currently in use worldwide. It analyzes and examines the frameworks and approaches utilized in those assessment/rating systems, and to what extent are appropriate to the Saudi Arabia e environment and context. The in-depth comparative analysis includes identifying the various sustainability categories, sub-categories, indicators and variables or parameters addressed in each assessment/rating system, as well as how the weighting mechanism is conducted. It also critically examines the level to which each system covers the three core dimensions of sustainability, and the possibilities for improvements to fit the Saudi context.
Prerequisite: ARC 501

ARC 516 Regional Traditions and Sustainable Architecture (3-0-3)
This course investigates sustainable architecture as a phenomenon situated in place, time, and context. It critically examines sustainable architecture, not only as energy performing architecture, but also as region-specific phenomenon shaped by a particular social, cultural, economic and physical context. The course investigates regional traditions as a renewable resource that contributes to contemporary sustainable building practices. It emphasizes on how sustainable architecture is best captured and practiced as regional architecture and traditions that continue to shaping and transform contemporary architecture and places, while adopting, adapting and transforming new technologies and inventions. The focus of the course will be on examining and analyzing sustainable architecture from the perspective of regional traditions and practices (i.e. indigenous vernacular and contemporary vernacular) that reflects the region's particular traditions, materials and cultural values; and resolve/balance the contradictions between necessity of cultural continuity and the desire of progress and innovation. The course also introduces sustainable architecture from the contemporary cultural discourses. Concepts and processes such as critical regionalism, critical vernacular, and identity are also examined in this context.
Prerequisite: Graduating Standing

ARC 517 Sustainable Landscape and Site Planning (3-0-3)
This course examines advanced topics in the theory and practice of landscape design and site planning, with focus on sustainability issues. Students will be exposed to theoretical, technical and practical aspects of sustainable landscape and site planning such as such as climate responsive landscape design, plant selection, design with native and adaptive plants, green roof design, xeriscaping, sustainable or eco-landscaping practices, site planning, site assessment, sustainable site design and management, sensitive site design, storm water management, rainwater conservation, preserving and enhancing biodiversity, heat island effect. The course will highlight sustainable landscaping issues related to water

as a scarce resource in Saudi Arabia.
Prerequisite: Graduating Standing

ARC 518 Master Design Studio A (Sustainability) (1-4-3)
This studio introduces students to advanced design studio practices at master level. The studio concludes and implements the concepts and practices of sustainable architecture introduced in the Master's Program in a studio-based environment. Students will carry out comprehensive architectural design projects that couple functional requirements, pleasurable qualities, and sustainable design requirements related to site, energy and water efficiency, green building materials, and indoor environmental quality. Building performance assessment using numerical analysis is required. The prescribed projects may range in size from small buildings with detailed assessment to large ones with urban dimension. Students will go through several juries to defend their projects and submit a final design report that include full documentation of the design project. Design research, reading, field visits, and lectures are integral part of the studio.
Prerequisite: ARC 501, ARC 502, Completion of at least three elective courses

ARC 530 Design Theories and Methodologies (3-0-3)
This course investigates the various design theories and methodologies used in solving complex architectural design problems. Through lectures, case studies, research and short design assignments, students acquire experience in design thinking techniques, strategies, and processes. The first part of the course investigates major normative and positive design theories and approaches including design as a rational problem solving, design as reflection in action, as well as other design methodologies and models from empirical studies and design methodology fields. The second part examines the basic principles and techniques of design thinking as applied in the different phases of the architectural design process. The course will investigate a wide variety of creative design thinking techniques, approaches and methods used to develop innovative solutions to real-world design problems in architecture and relative creative fields. This includes design thinking methods such as brainstorming & idea generation, lateral thinking, abstract thinking, user focused thinking that utilized to facilitate the discovery, re-interpretation, ideation, experimentation and generating of alternative design solutions.
Prerequisite: Graduating Standing

ARC 531 Advanced Topics in Digital and Parametric Design (2-2-3)
This course investigates parametric design packages as tools for architectural design. It introduces advanced techniques, and methods in architectural parametric design, including generating and evaluating design alternatives, analyzing design performance, and exploring, refining and developing architectural form. During the course students create, analyze and evaluate complex generative/computational designs that takes into consideration aspects of form, material, performance, structure and fabrication. The course introduces the theoretical as well as the practical aspects of computational parametric design through lectures, hands-on sessions, and practical assignments or projects. The course also critically examines the impact of parametric design tools on the architectural design process and the resultant architectural products.
Prerequisite: Graduating Standing

ARC 532 Behaviorally Informed Design (3-0-3)
This course investigates the relationship between human behavior and design of the natural and built environments. It examines a wide range of psychological, social, cultural concepts, theories and principles which impact the design of architecture and the built environment. The course investigates relevant advanced topics such as the impact of behavioral sciences on architectural theory; the reciprocal relationships between people, the built environment and environmental behavior; perception, cognition and human behavior; privacy and territoriality; comprehensive theory of human behavior for design; behavior setting as design and analysis tool; theories and concept of person- environment interactions; re-examining functionalism in the light of affordability theories; formal and symbolic aesthetics, universal and place-specific design; design for social groups and social interaction, among others. Applying this these behavior-based knowledge and theories to the design of specific building types is emphasized through case studies, exercises, projects or research papers.
Prerequisite: Graduating Standing

ARC 533 Ecology, Technology, and Design (3-0-3)
This course provides an in-depth investigation of the complex, interacted relationship between ecology, technology, society and design. It critically examines contemporary architecture and urban design approaches that emphasizing living in harmony with nature, and regenerating the environment. It explores the evolving concepts and approaches to architecture and urban design such as regenerative design, biomimicry/biomimetic design, eco design, organic design, eco-tech, regenerative design, livable buildings, neo-traditional design, and new urbanism among others. Design strategies and principles of those design approaches are emphasized. The course also examines how position towards place and technology, and their role in architectural design has evolved in modern and postmodern societies. The design approaches that focus on revealing and continuing the particular of the place, while adapting and transforming the modern; and balancing the various conflicts imposed by industrialization/technology on the ecosystem are examined.
Prerequisite: Graduating Standing

ARC 534 Architectural Theory and Criticism (3-0-3)
This course covers advanced topics on contemporary architecture theory and criticism. Through readings, discussion and case studies the course critically investigate the rationale, technical, socio-cultural contexts, and intellectual backgrounds of these contemporary theories and practices, with focus on critical positions developed within these theories and practices. The course will also cover concepts, fundamentals, methods and theories of architectural criticism, as well as relevant analytical frameworks, and writing critical texts. "Critical theory" in the context of architectural discourse is also introduced. During the course, students will apply these critical positions and write critical analysis, criticism, and scholarship writings on examples of contemporary architecture to develop understanding of contemporary architecture including cases from the region.
Prerequisite: Graduating Standing

ARC 535 Theory and Methods of Urban Design (3-0-3)
This course examines the fundamentals of urban design theory and methods as evolved in the modern and postmodern times. Key contemporary urban design theories and methods that address the various dimensions of urban design including social, visual, functional,

temporal, morphological, and perceptual and cognitive are examined thoroughly. Particular focus is given to the application of those theories on neighborhood design within the Saudi context. The course comprises of theoretical as well as practical issues. Through lectures, extensive readings, case studies, individual and group discussions, analytical and short design exercises students will gain deeper understanding of urban design language, theories, methods and practices.
Prerequisite: Graduating Standing

ARC 536 Design Quality and Management (3-0-3)
This course focuses on examining design quality as reflected in the final architectural products rather than during the design process. Concepts, methods, attributes and tools of architectural design quality and its management are investigated. The course provides an overview of design quality fundamentals such as various dimensions of design quality, its standardization, and how to quantifying and assess it using indicators. It also introduces total quality management (TQM) and its relation to design quality, innovation as design quality, performance measurement in the design and construction, design quality indicators, and metrics and assessment tools for evaluating design quality in architecture and buildings.
Prerequisite: Graduating Standing

ARC 537 Architecture and Contemporary Structural Systems (3-0-3)
This course discusses the most recent technological developments in the field of structural systems and space enclosure, and their impact on architectural design considering their functional and environmental effectiveness. This is in addition to their influence on buildings in terms of external appearance and internal functionality. In this context, the course presents the various kinds of the modern space structures, their integration into design in terms of form, materials and details, and an evaluation of the different alternatives in terms of cost and benefit. The course concludes with practical applications and field visits, in addition to the use of advanced computer applications in this regard.
Prerequisite: Graduating Standing

ARC 538 Master Design Studio B (Advanced Design) (1-4-3)
This studio introduces students to advanced design studio practices at master level. It focuses on exploration of themes, methods, and technologies in contemporary architectural design. The studio represents a critical summation of the knowledge and capabilities developed in the design concentration area of the Master program. Students are required to create well-articulated architectural design solutions using advanced and integrated design methodology and techniques. Theme of the studio differs from semester to another. Design research, reading, field visits, and lectures are integral parts of the studio.
Prerequisite: ARC 501, ARC 502, Completion of at least three elective courses

ARC 590 Special Topics in Sustainable Architecture (3-0-3)
This course covers selected special topics in Sustainable Architecture that are not covered in the core and elective courses. The contents of this course will be in one of the areas within the broad areas of Sustainable Architecture. The course aims to provide students with recent developments in the field or advanced specialized knowledge in the Sustainable Architecture not covered in core and required elective courses. The specific contents of the

special topics of course will be given in detail one semester before the offering.
Prerequisite: Graduating Standing

ARC 591 Special Topics in Architecture Design (3-0-3)
This course covers selected special topics in Architectural Design that are not covered in the core and elective courses. The contents of this course will be in one of the areas within the broad areas of architectural design. The course aims to provide students with recent developments in the field or advanced specialized knowledge in the architecture design areas not covered in core and required elective courses. The specific contents of the special topics of course will be given in detail one semester before the offering.
Prerequisite: Graduating Standing

ARC 599 Graduate Seminar (1-0-0)
Students are expected to identify a research topic, conduct literature review, and present at least one seminar on a timely research topic, preferably related to his master thesis research or master design project. The course focuses on scientific research aspects addressed earlier at ARC 500 including topics such as problem statement, hypotheses, research design, validity of research findings, data reliability, data collection techniques, basic elements of the research proposal. This is a pre-thesis course. Major parts of the Master thesis proposal or master design project are expected to be developed at this course. Course graded on a Pass or Fail basis.
Prerequisite: ARC 500, ARC 501

ARC 600 Master Design Project (1-4-3)
This is a design-based inquiry project. The student will utilize his knowledge and skills developed during his graduate studies in researching and solving a complex architectural design problem under the supervision of an architecture faculty advisor. The design research topic should be in the selected concentration area. The Master Design Project, composed of both design drawings as well as a design research report, will be presented and evaluated by a faculty committee representing the student's area of concentration.
Corequisite: ARC 599
Prerequisite: Completion of all core course and at least four elective courses

ARC 606 Independent Research (3-0-3)
This course is a research course that is based on independent research rather than taught coursework. It can be taken by students pursuing the thesis option of the M.Sc. in Architecture. It is offered on a student-to-faculty basis. To register for this course, the student should have a clear Research Plan of the intended research work planned to be conducted in the course approved by the Graduate Committee of the Department and reported to the Deanship of Graduate Studies. At the end of the course, the student should submit a report of his work in the course and present it publicly to the Department Graduate Committee.
Prerequisite: Graduate Standing

ARC 610 Master Thesis (0-0-6)
Each student is required to prepare an original Master Thesis that researches an area of his

particular interest under the supervision of a graduate faculty member in ARC department. The thesis work should be an original research on an approved topic that contributes new knowledge to the field of architecture. Upon completion of the thesis work, the student is required to make a formal defense of his research thesis.
Corequisite: ARC 599
Prerequisite: Completion of all core course and at least two elective courses