UNIVERSITI SAIN MALAYSIA (USM)

USM ARCHITECTURE PROGRAM 2018

1) ACTIVITIES OF EXCHANGE PROGRAMME

A) UNIVERSITI SAINS MALAYSIA (USM) – TECHNICAL UNIVERSITY OF LIBEREC (TUL), CZECH REPUBLIC STUDENTS EXCHANGE PROGRAMME (SEP)

Year Started: Academic Session 2016/2017
Students Exchanged: 2 Inbound & 2 Outbound for each semester of every Academic Sessions since the SEP started

B) UNIVERSITI SAINS MALAYSIA (USM) – TECHNICAL UNIVERSITY OF MADRID (UNIVERSIDAD POLITECNICA DE MADRID - UPM), SPAIN STUDENTS EXCHANGE PROGRAMME

Year Started: Academic Session 2015/2016
Students Exchanged: 2 Inbound & 2 Outbound for each semester of every Academic Sessions since the SEP started

2) USM ARCHITECTURE LECTURERS AND AREAS OF SPECIALIZATION

No.	Names of Lecturers	Academic Programme	Expertise (Main Area)
1	Ahmad Sanusi Hassan, Dr. Professor (Deputy Dean – Academic & Students)	Architecture	▪ Architecture ▪ Urban Design ▪ Computer Aided Design and Animation
2	Aldrin Abdullah Dr. Professor (Dean)	Architecture	▪ Crime and the Environment ▪ Safety and Security ▪ Quantitative Methods ▪ Landscape Design ▪ Landscape and Thermal Comfort
3	Ku Azhar Ku Hassan, Ar. Dr. Associate Professor	Architecture	▪ Environmental Design ▪ Housing ▪ Professional Practice
4	Muna Hanim Abdul Samad, Dr. Associate Professor	Architecture	▪ Building Technology ▪ Building Design ▪ Fire Safety Design ▪ Green Building Design & Education
5	Sharifah Fairuz Syed Fadzil, Ar. Dr. Associate Professor	Architecture	▪ Architectural Design ▪ Environmental Building Performance
6	Mohd Najib Mohd Salleh, Ar. Senior Lecturer	Architecture	▪ Energy Management and Audit ▪ Building Design ▪ Design Management ▪ Professional Practice ▪ Architecture Technology
7	Jestin Nordin Senior Lecturer	Architecture	▪ Architecture ▪ Disaster ▪ Responsive Design ▪ Disaster Management & Planning
8	Mazran Ismail, Dr.	Architecture	▪ Architecture

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No.	Names of Lecturers	Academic Programme	Expertise (Main Area)
	Senior Lecturer		▪ Environmental Design ▪ Housing Design
9	Mohd Hafizal Mohd Isa, Dr. Senior Lecturer	Architecture	▪ Indoor Environment ▪ Building Energy Consumption ▪ Thermal Energy Storage ▪ Sustainable Architecture
10	Muhamad Azhar Ghazali, Dr. Senior Lecturer	Architecture	▪ Renewable Energy ▪ Sustainable Architecture ▪ Architecture
11	Nooriati Taib, Dr. Senior Lecturer	Architecture	▪ Architecture ▪ Landscape and Thermal Comfort ▪ Env. Building Performance
12	Hazril Sherney Basher, Dr. Lecturer	Architecture	▪ Energy Efficient Design ▪ Thermal Performance ▪ Green Building ▪ Environmental Design
13	Tan Bee Eu, Ar. Lecturer	Architecture	▪ Architecture + Urban Planning ▪ Interior Architecture ▪ Universal Design ▪ Urban Renewal ▪ Highrise Design ▪ Professional Practice
14	Zalena Abd. Aziz, Ar. Lecturer	Architecture	▪ Architecture ▪ Interior Design ▪ Heritage Impact Assessment Report (HIA) ▪ Development Proposal Report ▪ Industrialized Building System

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3) DETAILED & BACKGROUND OF THE CORE COURSES SYLLABUS/CURRICULUM FOR ARCHITECTURAL PROGRAMME

BACHELOR OF SCIENCE HBP (HONS.) (ARCHITECTURE)	**108 CREDITS**
MASTER OF ARCHITECTURE	**64 CREDITS**
TOTAL	**172 CREDITS**

3.1 Bachelor of Science HBP (Hons.) (Architecture) Programme

a) List of Courses

i) Core Courses (90 Units)

Code and Title			Unit	Semester	Year
RAS 101	-	Design Studio I	7	1	1
RAS 102	-	Design Studio 2	7	2	1
RAG 121	-	Environmental Science I	3	1	1
RAG 132	-	Introduction to Built Environment & Human Settlement	3	1	1
RAG 161	-	Building Construction I	3	1	1
REG 163	-	Theory of Structures I	3	2	1
RAS 203	-	Architectural Studio 1	7	1	2
RAS 204	-	Architectural Studio 2	7	2	2
RAG 232		Architectural Working Drawing & Documentation	3	2	2
RAG 234	-	Computer Aided Design for Architecture	3	1	2
RAK 232	-	Principles of Architecture Design	3	1	2
RAG 265	-	Building Construction 2	3	2	2
RUL 274	-	Compulsory Practical Training	6	2	2
RAG 322	-	Environmental Science 2	3	2	3
RAG 333	-	Advanced Computer Aided Architecture Design	3	1	3
RAK 345	-	Housing Studies	3	2	3
RAS 305	-	Architectural Studio 3	7	1	3
RAS 306	-	Architectural Studio 4	7	2	3
RAK 344	-	History and Theory of Architecture 1	3	2	2
RAK 346	-	History and Theory of Architecture 2	3	1	3
RAL 371	-	Measured Drawing	3	1	3

ii) Elective Courses (18 Units)

Code and Title			Unit	Semester	Year
RMK 153	-	Principles of Construction Economics*	3	1	1
RMK 252	-	Principles of Project Management*	3	2	1
REG 261	-	Building Services*	3	2	2
RMK 354	-	Construction Law*	3	2	3
REG 360	-	Industrialized Building System (IBS)*	3	2	3
RBG 351 /	-	Building Maintenance** /	3	1	2
REG 266 /		Theory of Structures II** /	3	1	2
REG 232 /		Land Surveying**	3	1	2

**Recommended courses*

*** For REG 266, students have options either to take that subject or its alternatives: RBG 351 or REG 232*

3.2 Master of Architecture Programme

a) List of Courses

i) Core Courses (54 Units)

Code and Title			Unit	Semester	Year
RAS 505	-	Architecture Studio 5	7	1	1
RAS 506	-	Architecture Studio 6	7	2	1
RAS 603	-	Design Thesis 1	7	1	2
RAS 604	-	Design Thesis 2	7	2	2
RAT 530	-	Energy Efficient Building Design Technology	3	1	1
RUL 674	-	Research Project	8	1 & 2	2
RAG 662	-	Building Technology	3	1	2
RAK 555	-	Professional Practice in Architecture 1	3	2	1
RAK 655		Professional Practice in Architecture 2	3	2	2
RAT 641	-	Architectural Critics	3	1	2
RAT 532	-	Architecture in Urban Design	3	2	1

ii) Elective Courses (10 Units)

Code and Title			Unit	Semester	Year
REG 562	-	Building Services Technology*	4	1	1
RMK363 / REG 361	-	Construction Economics* / Methods of Construction	3	1	1
RHS 505 / RPK 535	-	Law and Housing* / Regional and Rural Planning	3	2	1

*Recommended courses

b) Synopsis and Learning Outcomes of The Courses

Core Courses

RAS 101 - Design Studio 1

This course exposes the students to the basic elements and principles used in designing works. Students are guided to come up with spatial designs based on basic design elements and principles learned from exercising projects either individual or in group works. Students are then to exhibit, and to explain their design works.

Learning Outcomes

At the end of the course students will be able to:
(i) Explain basic elements and principles of design
(ii) Exhibit design works by using the understanding of basic elements and principles of design
(iii) Present the outcomes of comprehensive architectural design project individually or in group

RAS 102 - Design Studio 2

The objective of the course is to train students to become an architect. The course emphasises the basic understanding of the processes involved in the development of architectural design and planning. The designs to be created must take into consideration all the needs of functionality, aesthetics, technology, eco-friendly, and sustainable; through the process of data collection, analysis of the site, and also its synthesis. The course will also emphasise the need to understand the fundamental aspects of space layout (both external and internal), forms, and also landscaping. Students will be exposed to the underlying implementation of a small-scale construction project. However, it is limited to only a one-storey (1) building. The students will also be guided to understand the critical processes of the formation of an idea, concept, design, material selection, choice of construction methods, and the application of technology to the design. Therefore, the course is designed in such a way to support students to be able to produce, showcase, and report on an architectural design created.

Learning Outcomes

At the end of the course students will be able to:
(i) Explain design concept based on elements and principles of architectural design
(ii) Exhibit appropriate small scale architecture design that shows the basic needs, function, hierarchy, aesthetic, technology and site analysis
(iii) Elaborate the outcomes of comprehensive architectural design project individually or in group

RAG 121 – Environmental Science 1

This course discusses on physical environmental issues and its measurement methods. It targets students to understand the physical environment in a holistic form, reviewing the condition and the quality of the national physical environment and the negative effect of unbalanced development. It also gives students the understanding of the interrelationship between environmental issues and climatic or ecological building design especially for the tropics. The students are also expected to understand the simple quantitative and qualitative evaluation methods on human comfort condition for the tropics. They are also expected to understand various aspects of natural or passive buildings' environmental or indoor climatic control such as natural ventilation, day lighting, shading design, heat flow, energy, noise control and acoustic.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify environmental issues of the country, current environmental problems including pollution issues and their relation with built environment
(ii) Show skills in using basic measuring tools to measure climatic elements qualitatively or quantitatively in evaluating thermal comfort
(iii) Study basic function and natural ventilation strategy, basic principles of natural lighting and its expectation, solar radiation control with shading design and principles of heat gain and heat loss in the building

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RAG 132 – Introduction to Built Environment & Human Settlement

This course introduces the origins of human settlement on a various scales. The theory of the built environment and the regulations associated with it will be discussed.

Learning Outcomes

At the end of the course students will be able to:
(i) Relate the elements in built environment with the history of human settlement.
(ii) Understand and practice regulations associated with built environment.
(iii) Respond in the way of group discussion about issues associated with human settlement.

RAG 161 – Building Construction 1

This course introduces basic comprehension pertaining to building and materials used in the building components, beginning with systems, basic structure and its building relationship. It covers the main component of substructure, superstructure and roof systems.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify construction materials which used in constructions.
(ii) Organise types of materials suitable for constructions and sketch construction system in simple way.
(iii) Propose materials and construction system which are suitable for building constructions.

RAS 203 –Architecture Studio 1

This studio course emphasizes on basic elements and principles used in building and environmental designs. Students are guided to come up with spatial designs based on design elements learned from exercising problem based projects, either individual or in groups. This course is a learning process of designing one to two storey buildings with an expresion of architectural concept based on design and planning principles, physical structures, energy efficient technologies & services, internal & external circulations, and ecological & sustainable design. Students are also exposed to the right planning process and schematic design development in completing architectural studio projects using manual architectural graphic presentation.

Learning Outcomes

At the end of the course students will be able to:
(i) Show understanding of design elements and principles in architectural design
(ii) Explain the ecological and sustainable design based on basic understanding of building technology, structure and building services
(iii) Show understanding of the design and planning process in producing schematic drawing for building up to 2 storeys with specific usage
(iv) Suggest a site planning that is appropriate with site context based on individually or collaboratively done site analysis
(v) Produce architectural drawings of building design and its spaces based on design concept and appropriate site planning

RAS 204 – Architecture Studio 2

This course focuses on designing buildings up to three storey height with significant architectural concept based on design and planning principles that suit with building typology and site context. It also aims to strengthen students understanding on energy efficient and environmentally friendly building technology, structure and basic building services. The course also exposes the students to the design of public buildings with ecological and sustainable building approaches. Students are also required to exhibit and explain their design which is produced using computer aided architectural graphic presentation and other appropriate techniques.

Learning Outcomes

At the end of the course students will be able to:
(i) Illustrate the understanding of design elements and principles in architectural design
(ii) Justify the ecological and sustainable design based on basic understanding of building technology, structure and building services
(iii) Show understanding of the design and planning process in producing schematic drawing for building up to 3 storeys with general and specific usage
(iv) Suggest a site planning that is appropriate with site context based on individually or collaboratively done site analysis
(v) Produce architectural drawings of building design and its spaces based on design concept, appropriate site planning and Universal Design

RAK 232 – Principles of Architectural Design

The course encompasses the scope and definition of architecture language and vocabulary which includes elements of architecture design such as lines, shapes, color, texture, space, volume and scale. It also touches on architectural principles such as unity, contrast, proportion, harmony, balance, dominance and subordination, gradation; time and sequence. The course uses selected examples from historical and contemporary architecture to show relationship between form and function, technology, art, society and other elements and their effect on design. The course also covers case studies of important contemporary and past figures in architecture.

Learning Outcomes

At the end of the course students will be able to:
i) Define the architectural elements and principles.
ii) Interpret and sketch the product critically.
iii) Relate and report the architectural element and principles with the case studies.

RAG 232 – Architectural Working Drawing and Documentation

This course exposes students to the role and status of drawings and other documents in the legal, contractual, administrative and technical context through the various project stages from pre-contract to post-contract. Students will be introduced to information structuring for working (submission/tender/contractual/production) drawings, schedules, detailing and specifications.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify the role and status of drawings and other documents in the legal, contractual, administrative and technical context through the various project stages from pre-contract to post-contract.
(ii) Draw clearly and comprehensively using correct graphic symbology to convey accurate

instructions on built form, sizing, technology, materials, construction suitable for statutory, contractual and building purposes.

(iii) Select between different materials, finishes and technology to best reflect client or project requirements and aspirations. Write in a succinct and concise manner, a specification document describing the quality of workmanship and material to be used with a set of project drawings.

RAG 234 – Computer Aided Design for Architecture

This course gives exposure and training to students on how to produce two dimensional architectural drawings like plans, elevations, sections and detailings using the application of technology and computer aided software (AutoCAD).

Learning Outcomes

At the end of the course students will be able to:

(i) Develop 2 dimensional architectural drawing skills using AutoCAD software.
(ii) Produce drawings using the available commands in the AutoCAD software and having the ability to use all the commands to produce drawings.
(iii) Discuss as a team and presenting the edited and printed drawings according to required scale and paper sizes.

RAG 265 – Building Construction 2

This course is a continuation of Building Construction 1 with emphasis on more complex building systems and advanced material. The scope covers construction systems from sub-structure such as pilings, retaining walls and basement constructions. It also elaborate on super structure of in-situ reinforced concrete, precast concrete as well as steel frames and their various component from columns, beams and floorings such as two-way, one-way, ribbed, waffle and precast slabs as well as composite floors. This course also outlines the wide span roof structures, construction and finishes. It also covers on state-of-the-art building envelope and finishes such as curtain walling and different types of claddings.

Learning Outcomes

At the end of the course students will be able to:

i) Elaborate on types of materials, components and details of construction system.
ii) Illustrate and explain critically, the systems according to appropriate use for construction and detailings.
iii) Collect and analyse case study data through observation and interviews as well as report and present information in a critical manner.

RAS 305 – Architecture Studio 3

The course guides the students to acquire a solid understanding of the design process involving medium storey buildings located in rural or natural environment. Exposure focuses on a sustainable and ecological approach to the planning and design of the site and building architecture. Guidance is given to integrate environmental friendly structure, building services, technology, materials and construction.

Learning Outcomes

At the end of the course students will be able to:

(i) Explain through graphics the elements and principles of architectural design with sustainable and ecological concept.
(ii) Give response through presentation on existing site planning and building design based on analysis of form, space, aesthetic, technology, structure, building services, material

and construction
(iii) Reproduce individually and collaboratively, the site planning and design, form and space by using the design elements and principles based on the sustainable and ecological concept.
(iv) Sketch the architectural building form and spaces with integration of structure, building services, technology, material and construction based on the sustainable and ecological concept.

RAS 306 – Architecture Studio 4

Students are guided to acquire a sound understanding of the processes, elements and principles involved in the urban design context. Freedom are given to handle projects involving a comprehensive planning and design of a building which focuses on the integration of structure, building services, technology, materials and construction in an urban area. Students will be exposed to elements and principles or urban design with urban infill characteristics.

Learning Outcomes

At the end of the course students will be able to:
(i) Sketch the elements and principles of design and urban planning
(ii) Give response through presentation on existing site planning and urban design based on analysis of form, space, aesthetic, historical aspects and heritage building.
(iii) Reproduce individually and collaboratively, the site planning and design, form and space by using the urban design elements and principles for midrise building that comply with local council guidelines and Uniform Building By Law (UBBL)
(iv) Sketch the architectural building form and spaces with the integration of sustainable structure, building services, technology, material and construction that suit with local climate and culture

RAG 322 - Environmental Science 2

This course starts by understanding the building physical environment specifically, starting with building ventilation, decay and deterioration, heat control and light, building maintenance and energy saving. Its understanding is reinforced through evaluating the quality of building environmental control passively and actively, and method of integrating the whole building system. It is then related to the understanding of the design needs based on climate through innovative design solutions which have successfully being developed and adopted in the current building design.

Learning Outcomes

At the end of the course students will be able to:
(i) Use environmental measuring instruments and analyse the data that have been collected
(ii) Relate the theory of basic environmental science with the reality of environmental problem facing by the building
(iii) Explain the causes of environmental problem occurred in the building and suggest the way to solve it
(iv) Analyse and summarize the outcomes of the study and present it critically

RAG 333 – Advanced Computer Aided Architecture Design

This course is to develop skills and creativity in documenting 3 dimension working drawing, report and animation clip in architecture and interior design using special software

Learning Outcomes

At the end of the course students will be able to:
(i) Produce drawings of building elements in 2 dimension, 3 dimension and animation using appropriate menus of computer software.
(ii) Creatively suggest and produce 3D building plan through animation presentation aided by computer software

RAK 344 – History and Theory of Architecture 1

This course covers design history and theory in architecture from Early Middle East to Renaissance civilisation (before modern period) using 'timeline context of architectural chronology' which contains architecture of Pagan, Christianity, Islam, Hindu, Buddha, Taoism and Shinto religion in Middle East, Europe, Africa, India, South East Asia and East Asia.

Learning Outcomes

At the end of the course students will be able to:
(i) Summarize architectural styles based on 'timeline context of architectural chronology' starting from early civilization in Middle East, Europe, Islam, India, China until Renaissance
(ii) Present the fact and explanation of history and theory based on systematic methodology regarding architectural styles and design.

RAK 345 – Housing Studies

This course discusses housing concepts, policies and human settlements. It explains the relationship between urbanization and housing, including the housing qualities and needs. The course also gives an overview on housing resources such as land, finance and technological aspects. It exposes the students to the housing strategies and alternative approaches, including project planning with feasibility studies and site analysis, as well as its social and physical aspects. In addition, it also touches on the several issues of housing such as the implementation of the government's housing transformation plans like OSC, CCC, housing sustainability, house typology and other various concepts of housing, and also explains the rationales of the enforcement of relevant acts and laws involved in the housing industry.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify housing concepts and connect them with physical conditions of existing housing development.
(ii) Explain the causes and effects of policy and regulations implementation in an effort to improving housing delivery and supply to the public
(iii) Propose solutions to the existing housing issues that have been identified from the field study conducted in group

RAK 346 – History and Theory Of Architecture 2

This course covers history and theory in architecture from pre-colonial time to the present day discussing on the Malay, colonial and modern architecture and their influences to developments of architectural design in Malaysia. This understanding is important which provides conceptual description linked with theory to the design of contemporary architecture rooted from architectural development through history in Malaysia.

Learning Outcomes

At the end of the course students will be able to:
(i) Critically correlate history and theory of architecture styles based on 'timeline context of architectural chronology' of Malaysia
(ii) Differentiate Malaysia architectural theories by reproducing sketches and explanation of history based on systematic methodology from the relevant sources regarding architectural styles

RAL 371 - Measured Drawing

This course is about preparing a documentation or record of a particular building in the form of scaled drawings and special reports. The drawings are to include the building location, site, floors, elevations, sections, 3-D drawings and detailing of special features of the building. The report is a compilation of the building's historical background, ownership and design development involved. Aspects of design concept, spatial function, technique of construction, building orientation and decoration will be investigated and reported. Techniques of building measurement include the application of theodolites, measuring tapes, photography and sketches on site.

Learning Outcomes

At the end of the course students will be able to:
(i) Prepare a scaled measured drawing of selected heritage building.
(ii) Relate the design of the above building with its background history and beginning.
(iii) Present a product of work in the form of scaled drawing and comprehensive report of the selected building.

RUL 274 – Compulsory Practical Training

This course emphasizes on compulsory practical training to students on matter related to practicing professional in related fields.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify tasks assign by firm or organization in professional manner
(ii) Display the ability to solve problems base on working field
(iii) Solve relevant design issues via teamwork

Elective Courses

RMK 153 – Principles of Construction Economics

This course emphasizes on market structure,supply and demand in marketing building industry. It introduces the economic concepts; main economic problems; demand, supply and market equilibrium; economic structure; cost and production are also being discussed.

Learning Outcomes

At the end of the course students will be able to:
(i) Demonstrate the ability to relate economic principles to the construction industry market .
(ii) Reproduce economic development models based on current situations .
(iii) Study the problems within the construction industry based on the volatility of the economy system.
(iv) Report the findings on the relationship between economy and the construction industry.

RMK 252 – Principles of Project Management

This course discusses on managing the construction industry encompassing the methods of basic planning, monitoring and controlling use in project management.

Learning Outcomes

At the end of the course students will be able to:
(i) Differentiate the various basic concepts within the aspects of management and organization
(ii) Manipulate the organizational objectives and structure as well as to identify the organizational environment
(iii) Explain the psycho-social aspects of management and organization
(iv) Demonstrate the methods of project management

RMK 354 – Construction Law

This course discusses building contracts, professionals, workmen compensation, and arbitration pertaining to property development including planning.

Learning Outcomes

At the end of the course students will be able to:
(i) Discover the laws pertaining to the construction industry
(ii) Dismantle the problems for each related law
(iii) Demonstrate and apply the provisions of law at the work place.
(iv) Explain and review the suitability of current law provisions

REG 163 – Theory of Structures I

This course comprise of the introduction of basic foundation of statics including concept of forces, distribution of forces, direct forces, moments, combination forces, polygons and triangular forces and equilibrium forces. This course also focuses on building frame structures, trusses using methods of force distribution, etc, in determining shear force, bending moments and deflection of static structure.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify the engineering properties of structure in critical way.
(ii) Calibrate the method of solutions for structure and concepts of bending moment and shear force in beam.
(iii) Study collectively about the forces in framework, stress in structure and methods of solution.

REG 232 – Land Surveying

This course covers the basic principles of surveying works including exploratory survey, level survey, traverse survey, theodolite survey, compass survey and tacheometric surrvey. Contour survey, contour development, determination of volumes in cut and fill works and also construction site survey will also be covered. Besides, introduction to GPS, control dan monitoring survey dan latest technology will also be introduced.

Learning Outcomes

At the end of the course students will be able to
(i) Apply the basic principles of land survey.

(ii) Analyze data and prepare land survey report.
(iii) Determine the problems that exist in building engineering.
(iv) Explain problems related to soil engineering and construction.

REG 261 - Building Services

This course focuses on the efficiency of building services and the systems involved. The building services that are mainly highlighted in this course are lighting, heating and ventilating, air conditioning, security and alarm systems and fire detection and protection. Students will be exposed to the principles, components and knowledge to design an appropriate building service system for different types of buildings such as residential, offices and multi-storey buildings.

Learning Outcomes

At the end of the course students will be able to:
(i) Elaborate every principles of basic building services component.
(ii) Display the ability of analyzing and preparing building services in a teamwork.
(iii) Propose teories and techniques in designing building services systems.

REG 266 – Theory of Structures II

This course focuses on the loading of structures and the relationship between stress-strain. Various types of loads and load-static, resultant force, moment and reaction theories will be discussed. Students will be exposed to analysis of beam reaction, shear and moment diagrams. Composite columns and beams analysis will also be covered. It also emphasized on the strength of materials in structures, analysis of determinate and indeterminate structures. Students are required to carry out laboratory experiments in addition to assignments and lectures.

Learning Outcomes

At the end of the course students will be able to:
(i) Identify critically determinate and undeterminates structure and their characteristics.
(ii) Unveil the concept of bending moment distribution and shear force, and also structure solving techniques.
(iii) Study the material strength and building structure and also problem solving method professionally.

REG 360 – Industrialised Building System (IBS)

The course introduces the concept of IBS as a sustainable construction in Malaysia. A comparative study of conventional and IBS building process and construction shall be introduced. Various IBS materials, technologies, financial and economic aspects will also be discussed in the course. Aspects of Modular coordination, Modular Design Rules and Structural Design concepts using components and assemblies will be introduced. Project management principles are also applied to IBS. Case study and site visits will be organised.

Learning Outcomes

At the end of the course students will be able to:
(i) Explain the concept of IBS in building construction.
(ii) Explain with figure the design concepts of IBS and modular coordination in building construction.
(iii) Demonstrate the skills in applying financial and economic application of IBS.
(iv) Elaborate and show the calculation of IBS Score.

RBG 351 - Building Maintenance

This course focuses on Maintenance Management and Technology. Students are exposed to variety types of building maintenance; planned and un-planned maintenance methods, maintenance policy, impact of design on maintainability, prioritizing and costing the maintenance works, budgeting and funding the maintenance works and maintenance procurement. It is also emphasis on building maintenance management technology for commercial building. Students are also exposed to preparation of maintenance plan and specification writing for maintenance works and finally on sustainable building performance aspect in order to provide a comfortable and productive environment to building users.

Learning Outcomes

At the end of the course students will be able to:
(i) Interpret the concept of maintenance of the building in a systematic manner and recognize the needs and requirements of building maintenance and operation
(ii) Diversification techniques and new technologies on maintenance and differentiate the techniques of building maintenance for old and new buildings;
(iii) Develop and establish maintenance plan and specification writings for maintenance works in a professional manner

3.3 Master of Architecture Programme

b) List of Courses

i) Core Courses (54 Units)

Code and Title			Unit	Semester	Year
RAS 505	-	Architecture Studio 5	7	1	1
RAS 506	-	Architecture Studio 6	7	2	1
RAS 603	-	Design Thesis 1	7	1	2
RAS 604	-	Design Thesis 2	7	2	2
RAT 530	-	Energy Efficient Building Design Technology	3	1	1
RUL 674	-	Research Project	8	1 & 2	2
RAG 662	-	Building Technology	3	1	2
RAK 555	-	Professional Practice in Architecture 1	3	2	1
RAK 655		Professional Practice in Architecture 2	3	2	2
RAT 641	-	Architectural Critics	3	1	2
RAT 532	-	Architecture in Urban Design	3	2	1

ii) Elective Courses (10 Units)

Code and Title			Unit	Semester	Year
REG 562	-	Building Services Technology*	4	1	1
RMK363 / REG 361	-	Construction Economics* / Methods of Construction	3	1	1
RHS 505 / RPK 535	-	Law and Housing* / Regional and Rural Planning	3	2	1

*Recommended courses

c) Synopsis and Learning Outcomes of The Courses

Core Courses

RAS 505 - Architecture Studio 5

This first studio of the Master in Architecture Program focuses on strengthening the various skills in the building design process and accumulated theory and ideas in architecture as well as imparting to students the complexity of a medium or high-rise building. This will be undertaken in two projects: firstly, a minor project focusing on design theory to reawaken the students' passion and soul for the philosophy and meaning behind their architecture and architects' works before them. Secondly, a major project to acquire and strengthen students' ability to design a medium to high-rise building, demonstrating the cohesive assimilation of the relevant issues to be solved. The issues include, integration of various technologies such as building construction, materials, structure and services as well as the problem solving of basement design, car parking and vertical circulation. Most importantly, to produce tall structures that heighten social and community spirit, and at the same time are energy efficient for social, environmental and economic sustainability. This is in spirit of future green cities where high-rise is the way forward to reduce building foot prints and increase green open space.

Learning Outcomes

At the end of the course students will be able to:

(i) Critique, relate and derive the design theory in solving design issues and adapting to a moderate scale project and a high-rise project
(ii) Gather and analyse site data and relevent issues through direct observation and interviews and reporting and presenting findings critically to generate a design brief as a group
(iii) Practice ethical conduct in solving issues of high-rise building and integrating the design ideas in sketch and completed design proposals through drawing presentation and report based on regulatory requirements and professional practice
(iv) Connect and piece together information by expanding the mindset through a clear methodology in generating design ideas.

RAS 506 - Architecture Studio 6

Architecture Studio 6 aims at exposing students to issues related to human settlement and dwellings. As a start, a small scale minor project is conducted to design a prototype in relation to residential project that fulfils sustainable criteria on materials, construction, services and social aspect. The second project is a major project which involves the design of a human settlement which focuses on social, economic, culture, sustainability, and sense of place as well as features the neighbourhood concept. Students are challenged to produce a dwelling unit that is innovative and satisfy the needs of low income group. Students are trained to think out of the box to meet the needs of the future in problem solving on housing especially affordable homes.

Learning Outcomes

At the end of the course students will be able to:

(i) Connect and practice design theory and solving design issues adapted to a housing project
(ii) Conduct a site data gathering and related issues through direct observation and interviews and to present information critically for a project brief individually as well as part of group decision making

(iii) Practice ethical conduct in solving human settlement issues, adaptation of design ideas in the form of presentation drawings and report based on responsibility on legal requirement and professional practice in design
(iv) Relate and integrate information and expanding the mindset through a specific methodology in formulating architecture design ideas.

RAS 603 - Design Thesis 1

Design Thesis 1 covers the implementation of architectural design projects proposed by final year students that correlates all acquired knowledge into a design topic of a special interest. Equal emphasis is given to practical aspects in research, innovation and problem solving, with realistic consideration as recognized by the industry in building design. Each student identifies his/her thesis topics, providing project summaries and research-related problems; analyzes and prioritizes issues in the proposed project site, triggering a concept; and designs the project's preliminary scheme. Documentation and graphic communication to express train of thoughts, sequence of ideas with concise and precise expression are very crucial. The final result of the project is a set of graphical illustrations of architectural design (drawings or models of physical/digital) with a design report.

Learning Outcomes

At the end of the course students will be able to:
(i) Display responsible capability as designers (architects) to comprehend and organize clients briefs/need, site and project issues.
(ii) Demonstrate design skill and creativity in design proposal and expand ideas based on information gathered from brief requirements, site, issues, concept, technology and regulations.
(iii) Exhibit capability in relating form, space, aesthetic, technology, structure, construction, materials and services in a design typology creatively and innovatively.
(iv) Compose competently in presentation of scaled drawings, model, textual and verbal communication clearly and satisfactorily to ensure execution of individual archetypal design idea are at par with professional architects in physical or digital media.

RAS 604 -Design Thesis 2

This studio is a continuation of Design Thesis 1 where the proposal in Semester 1 will be enhanced to an optimum level in solving design issues pertaining to the chosen subject matter. Attention is given to aspects of design details, technical specification, construction, structure, building services and environmental sustainability. Each student must highlight a special technology study in character and appropriate to the design issues. The final result of the project is a set of compact and accurate graphical illustrations of architectural design (drawings, physical models, structural and services study, and/or computer modeling/simulation) with a design and technical report.

Learning Outcomes

At the end of the course students will be able to:

(i) Develop competency in designing and expand creative appropriate solutions in architecture design details to a given brief, site, issues, concept, technology and regulations.

(ii) Display management skill and appraise architecture design solutions based on integration of space making, forms, construction systems and detailing considerations with appropriate and innovative technological solutions.
(iii) Synthesise drawing, modeling, textual, and communication skills in presenting a comprehensive archetypal solutions, solving structural and services integration and exploring a special study area in clear, professional and effective presentation and report.

RAT530 - Energy Efficient Building Design Technology

Students are exposed to the design elements that help to achieve lower energy consumption in building for human comfort. Strategies are geared towards the passive approach in general and using innovative active systems for the interior. Also introduced is the solar electricity approach. And to complete the picture students are being taught about the sustainable habits to be inculcated. This course also emphasize further on the building sustainability and the need for green rating by going through the "Green Building Index" document which upon understanding they are to implement these criteria into their projects in their design studio projects.

Learning Outcomes

At the end of the course students will be able to:
(i) Relate and accumulate understanding on passive and active design elements in solving issues on indoor climate.
(ii) Adapt the above mentioned elements in specific problem solving exercises in overall design decision making
(iii) Manoeuvre the application skill in executing the sustainable principles in attempts at achieving energy efficiency in buildings

RUL 674 - Research Project

The course is an exercise in applied research pertaining to a special interest on various topics and current issue applicable to the studio design issues and problem statements. This course extends over two semesters and exposes students to the correct methodology of research work from topic selection, problem identification, literature review, research methodology, data collection, analysis and communication. Students are encouraged to choose a topic relevant to their design thesis that will enhance their understanding of design theory and pertinent issues which reflect an area related to Malaysian Architecture.

Learning Outcomes

At the end of the course students will be able to:
(i) Analyse architecture design topics through exploration of theories and architectural knowledge concepts
(ii) Exploit data and information gathered to expand towards building design solutions
(iii) Develop architecture knowledge, method and critical analysis appropriate with current building design research through writing
(iv) Apply communication skills, to derive sound arguments, ethically and responsibly presenting environmental design solutions during supervision and verbal VIVA presentation.

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RAG 662 - Building Technology

This course is an advanced level of the building construction and components integrated with other building technology systems and building services. It starts with an outline on the development and evolution of technologies and materials followed by optimum integration of the structural and construction systems with the services systems with emphasis on high-rise buildings and sustainable requirements to produce green buildings.

Learning Outcomes

At the end of the course students will be able to:

(i) Explore, evaluate and derive knowledge on usage of materials, components and detailings of construction and building services systems
(ii) Appraise on the building systems integration of construction and services of existing building
(iii) Identify, collecting and relating data on case study and demostrate the understanding on the relevant systems through direct observation, interviews and critically analysing and present evident through report and verbal presentation.

RAK 555 - Professional Practice in Architecture 1

Exposure to the aspects of architect's professionalism: the Architect Act of 1967; LAM & PAM registration; the professional code of conduct of behaviour and responsibility to society; the work scope and professional fees; the appointment and the relationship with clients, consultants and contractors; stages and the offerment of work; control of project inside and outside the office (on site); organization and office-staffing; professionals references; consultancy status and appointment rules.

Learning Outcomes

At the end of the course students will be able to:

(i) Elaborate the ethical conduct of practice in the registration process of a Graduate/ Professional Architect Registration and the role of LAM, PAM, types of practices, consultants, clients and local authorities involved in the construction industry and development of a project/building in Malaysia..
(ii) Execute and organize as a team, mutual respect for other team player and coordinate data gathered as a team.
(iii) Distinguish decisions in building design, and devise management and entrepreneurship process based on Architects Act 1967 (2007), codes of practice, scale of minimum fees, and execute a construction project and present research findings.

RAK 655 - Professional Practice in Architecture 2

Exposure to the aspects of introduction of building contracts, types of contracts: PAM, JKR, CIDB etc. Special focus on contract's conditions: PAM (with/without Quantities), clauses, tender process, terms, preparation of documents, selection and tender's award in project implementation. Planning procedures, UBBL, building and fire control are also covered.

Learning Outcomes

At the end of the course students will be able to:

(i) Identify, elaborate and practice aspect of contracts in project management, legislative theories and architects professionalism
(ii) Organise in a team, practice aspect of projects implementation, administer group discussion and coordinate work output
(iii) Synthesize knowledge independently on professional practice management and contracts and communicate in skilful way.

RAT 641 - Architectural Critics

Students will be exposed to theories and current design thinking and encouraged to develop critical thinking on outputs of the architectural or prominent buildings. This course emphasizes intellectual and analytical concepts from various ideological architecture and design. It covers analysis of books, documents, writing materials or a particular article about the thought of the critics and authors. Some of the key topics are identified related to the operation of this course regional architecture, design vernacular, Malaysia and local identity, tropical design, international style, sustainable design, modern architecture movement, brutalism, post-modern architecture, deconstructivism, high-tech and design trends at the national and international levels. The approach of the course will emphasize the production of academic writing, seminars, reading the documents and selection of site visits for observation.

Learning Outcomes

At the end of the course students will be able to:

(i) Appraise critical aspect and theories of architecture
(ii) Produce writings and article compilation on architectural criticism
(iii) Present and communicate critical thinking ideas.
(iv) Conduct research in a team and in ethical manner

RAT532 – Architecture In Urban Design

This course focuses on a study of urban design elements and principles which are linkage theory, place theory, place making and urban systems. The course contents are also imparting study on the traditional, and post-independence urban design. In addition, this study consists of Garden City concept regarding issues in sustainability. This course will also render the latest urban design approach on compact city or intelligent city concept (also known as city of short distance or smart growth or new urbanism) as a comparative study on elements that emphasise friendly environment for pedestrian and cycling, social interaction, mixed-used buildings, transit systems and complete street design. A seminar will be held in presenting full paper presentation session by the students on their selected topic of urban design in Malaysia at the last week of the semester.

Learning Outcomes

At the end of the course students will be able to:

(i) Identify urban design elements within the field of built environment
(ii) Distinguish the development phases of urban design that involved in Malaysia
(iii) Manipulate crucial factors or distinct characteristics that contribute to the vitality of urban design and planning collated through research studies

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RMK 363 - Construction Economics

To impart knowledge of cost management and its importance, planning methodology, and overall cost planning in construction to the students. In addition, this course is designed to impart knowledge of the importance of constructional cost data towards the development of more effective future project development costs.

Learning Outcomes

At the end of the course students will be able to:

(i) Identify the criticality and classification of the construction processes
(ii) Organize the theories and principles that are practiced by professionals and progress on the building economy
(iii) Differentiate on the different techniques practiced in building economy
(iv) Demonstrate ways in collecting and managing relevant information on economic viability in construction projects and investigate on business and employment opportunities

RHS 505 - Laws and Housing

This course introduces related housing laws and regulation including the significance of housing developers Housing Development (Control and Licensing) Act 1966, relationship between laws and construction players i.e. developers, consultants, and government. This course enlightens the need for housing standard in Malaysia and National Land Codes, Land Acquisition Act 1960, etc. This course discusses legal history and present situation relating to Housing Development (Control and Licensing) Act 1966 and its subsidiary legislations– policy transition to green concept. This course covers the roles and scope of Town and Country Planning Act 1976, Local Government Act 1976, Street, Drainage and Building Act 1974 and some more relating to housing (including parties involved).Law relating to building contract will also be covered including contracts relating to existing building, relationship between construction players i.e. developers, consultants and contractors, and dispute resolution between the parties.

Learning Outcomes

At the end of the course students will be able to:

(i) Display respond to issues that arises in housing construction projects in relation to housing law
(ii) Execute housing project activities with relevant legislation and progress on housing construction by abiding to relevant regulations
(iii) Adapt the amendments law on construction situation to suit the housing activity project changes
(iv) Evaluate and interpret the housing law justification on every housing project developments
(v) Identify the code of conduct according to legislative law relevant to the built environment

REG562 - Building Services Technology

This course covers the indoor air quality, noise control, room acoustics, electrical and mechanical systems in buildings which include the fire prevention and control services, transportation in building, lighting system, mechanical ventilation and air-conditioning, plumbing and sanitary services in buildings and building services management /

commissioning. The students will be exposed to the principle of the systems followed by the design of the systems and its management and commissioning.

Learning Outcomes

At the end of the course students will be able to:

(i) Apply the correct principles, techniques, planning and design of various building services technology
(ii) Connect the theories and design techniques, management and activation of building services systems
(iii) Solve building services issues and practice professional code of conduct
(iv) Assemble the design of building services systems

REG 361 - Methods of Construction

This course is about the process and methods of construction. Students are given practical exposure on site management, earth work including cleaning, cut and fill, dewatering process from the construction site. They are also exposed to the basic design and preparation of concrete construction and removal of formwork for the prefabricated construction system, pre-stressed concrete construction and high rise construction.

Learning Outcomes

At the end of the course students will be able to:

(i) Distinguish project management concept and construction technique.
(ii) Select suitable and latest methods of construction based on current technology.
(iii) Report and solve construction issue based on engineering principal
(iv) Demonstrate technique of construction project management

RPK 535 - Regional and Rural Planning

The course explores the concepts of regional and rural planning while addressing the issues of regional inequality, rural economic development and rural sustainability. Methods of analysis are employed to investigate regional and rural growth and to evaluate economic impact. It is an application of regional and rural development theories and evaluation of balanced development concept. Focus is also on formulation of regional and rural growth strategies and policies that are balanced in terms of economy, rural and environmental sustainability.

Learning Outcomes

At the end of the course students will be able to:

(i) Distinguish the concept and theory of regional and rural planning
(ii) Describe the process that shape and influence the planning and development of regional and rural planning
(iii) Synthesize on the growth of regional and rural planning by studying the imbalanced region, economic effect and sustainability of rural development
(iv) Identify the policies and strategies in regional and rural development that are balanced in terms of economy, sustainable district and environment