AUD3211 - The Architecture of Medieval Europe

The study-unit addresses the History of Medieval Architecture, particularly in Western Europe.

Study-unit Aims

This study-unit is part of a suite of studies in the History of Architecture, which studies are important for the development of a historical context for the practice of architecture. Although it is an elective, candidates aspiring to read for a Masters degree in Architecture are required to follow a number of credits in History of Architecture, such as this one. In addition, this study-unit could be of interest to students of history in general.

Learning Outcomes

The student will be able understand the architectural landmarks that happened during a highly volatile timeline starting with the fall of the western Roman empire in 475 AD and ending with the fall of the eastern Roman empire in 1453. Theoretical and visual knowledge about Palaeochristian manifestations, Byzantium, the rise of Islam, the great Romanesque and Gothic cathedrals and monasteries of Europe, the military architecture of the Crusades and the complex factors leading to the Italian Renaissance in the fifteenth century will enable the students to better understand how architectural form and construction in Medieval Europe developed within a volatile geographical, political, religious and cultural context.
AUD3212 - The Architecture of the Early Modern World 1

The study-unit addresses the History of Renaissance Architecture in Western Europe.

**Study-unit Aims**

This study-unit is part of a suite of studies in the History of Architecture, which studies are important for the development of a historical context for the practice of architecture. Although it is an elective, candidates aspiring to read for a Masters degree in Architecture are required to follow a number of credits in History of Architecture, such as this one. In addition, this study-unit could be of interest to students of history in general.

**Learning Outcomes**

By the end of the study-unit the student will be able to:

read the architecture of Renaissance Europe, with a focus on happenings in Italy. In this context, students will also be exposed to theoretical and visual contextual knowledge about the emergence of the religious tensions prompted by the emergence of the Ottomans and Protestantism, the multifaceted scientific discoveries that characterized the European scenario during the one hundred years that elapsed between 1450 and 1550, the exploration of new world territories, the evolution of ideal city concepts and developments in the art of war. At the end of the study unit, students will be also be aware of the achievements of a number of key personalities who created the architecture of renaissance Europe: Brunelleschi, Alberti, Leonardo, Bramante, Michelangelo, Palladio and others.
**AUD3213 - The Architecture of the Early Modern World 2**

The study-unit addresses the History of Baroque Architecture in Western Europe.

**Study-unit Aims**

This study-unit is part of a suite of studies in the History of Architecture, which studies are important for the development of a historical context for the practice of architecture. Although it is an elective, candidates aspiring to read for a Masters degree in Architecture are required to follow a number of credits in History of Architecture, such as this one. In addition, this study-unit could be of interest to students of history in general.

**Learning Outcomes**

By the end of the study-unit the student will be able to:

read the architecture of the Baroque explained in the context of the religious, political and philosophical realities of the Baroque age in Europe during the 1550-1750 period. In this context, the visual material presented will among other themes, enable students to understand the ‘spirit of the Baroque’ by highlighting the achievements of a number of key personalities who collectively created the architecture of Baroque Europe in the seventeenth and eighteenth centuries: Borromini, Bernini, Cortona, Guarini, Juvara and so many others. At the end of the Study unit, students would also have acquired knowledge about the magnificent fortified urban scenarios, theatres and gardens of Baroque Europe.
AUD3221 - Theory of Digital Design

“Digital age is forging a very different kind of architecture [and built environment in general] and at the same time providing unprecedented opportunities... Digital technologies are enabling a direct correlation between what can be designed and what can be built, thus bringing to the forefront the issues of production, communication, application and control of information in the building industry” (Branko Kolarevic)

The study-unit focuses on the digital technologies used within the realm of contemporary architectural, structural, urban design and building construction and the radical changes introduced in the way built environments are analysed, designed and constructed.

The first part of the study unit is a historical overview of the development of the digital technologies in building industry from the early 1990s until today. It includes analysing work of a number of key architects, architectural practices, buildings and discourses in the field, with the aim of tracing back the digital processes that defined their final design.

The aim of the second part of the study-unit is to give a general overview of the digital tools relevant for entire the building industry and all its participants (architects, engineers, planners, including project managers, construction managers, surveyors...).

Study-unit Aims

To discuss digitally-driven processes, their origin, and their effects on the built environment and construction industry.

To trace the transformations within architectural thought, design and construction by looking both into architectural theory and practice.

To give an overview of contemporary digital tools, from basic to complex, throughout the whole spectrum of design and construction of the built environment. The overview looks both at:

- Digital planning technologies: geographic information system(GIS), mapping, simulation & optimisation (acoustics, wind, structure optimization...), computer aided architectural design (CAAD), rule-based planning (parametric), digital capture – terrestrial laser scanning (TLS), 3D scanning

- Digital production technologies that allow nonstandard design and mass customization: CNC technologies (precast concrete elements, laser cutting, jet cutting, hot wire cutting, milling & routing, bending, punching & nibbling), foaming & pressure foaming processes, robotics & robot-aided assembly processes, 3D printing & prototyping.
Learning Outcomes

By the end of the study-unit the student will be able to:

identify the developments within the realm of digital design.

Become aware of the available, and soon to be available, digital technologies relevant to contemporary building industry, from concept design to construction.

Understand the shift in the architectural practice brought about with digital technologies
BLH3301 - Philosophy of Conservation

The study-unit introduces students to the philosophy of Conservation, in particular applied to the Built Heritage.

Study-unit Aims

The aims of this study unit are to understand:

1. The different values involved in conservation
2. The importance of ethics in conservation
3. The anthropological issues in conservation - namely issues of sense of place, belonging and memory.

Learning Outcomes

By the end of the study-unit the student will be able to:

1 - Explain correctly the different values cultural heritage may present to different sectors of the same society
2 - Demonstrate knowledge of the ethical obligations a conservation project presents to the different players in the project.
3 - Define the concept of a monument, how this has changed in the 20th century and how this reflects the development of society.
Study-unit Aims

To provide a comprehensive introduction to traditional materials used in the construction of historic buildings, including stone, mortars and plasters. The study-unit aims to provide the students with information pertaining to the origin, manufacture, composition and properties of these materials, to understand their behaviour also in relation to a given environment.

Learning Outcomes

By the end of the study-unit the student will be able to:

- List and describe the important characteristics of traditional building materials which dictate their behaviour, including their origin, manufacture, composition and properties

- Explain why these materials are compatible with each other

- Explain in broad terms why/how these materials degrade
This study unit focuses on the technologies of producing concrete structures, from the constituent materials, to the mix design, and to the casting and finishing processes.

Study-unit Aims

Concrete is one of the most widely used building material. The ubiquitous use of concrete is attributed to three main factors:

(1) its resistance to water;

(2) the ease by which structural concrete elements can be formed, in a variety of shapes and sizes;

(3) the fact that it is usually the cheapest and most readily available material.

However the choice of concrete as a construction material is also governed by engineering and environmental considerations. Knowledge of the fundamental properties of concrete and its constituent materials, and the performance and behaviour of concrete and concrete elements and structures is of seminal importance in understanding construction processes and systems.

Learning Outcomes

By the end of the study-unit the student will be able to:

Explain the effect of the properties of constituent materials, including aggregate, cements, reinforcement and additives or admixtures, on the production of concrete, and its final state;

Explain the differences between different methods of concrete construction, including in-situ, precast, reinforced and pre-stressed work, pumped concrete and shot-crete, and other techniques;

Understand European and international standards for the production, and handling of concrete materials and of concreting;

Identify the processes, labour content, and plant required for the production of concrete, so as to be able to quantify the effort and resource cost involved;

Understand the principles behind formwork design, and the techniques available to obtain different concrete surface finishes;

Explain the properties of fresh concrete, including plastic and shrinkage cracking, curing, setting and hardening, and the properties of hardened concrete, including elasticity, shrinkage, creep and thermal movements.
CNM3421 - Degradation of Building Materials 1

This study unit addresses the degradation of the main construction materials, including reinforced concrete and stone. Ways of mitigating the weathering phenomena are also briefly discussed.

Study-unit Aims

This study unit aims to provide a basic understanding of:

(a) the factors affecting the durability of concrete and reinforced concrete structures

(b) the weathering, protection, and treatments of stone used in buildings

Learning Outcomes

By the end of the study-unit the student will be able to:

Explain the processes of corrosion of reinforcement in concrete, and the role played by carbonation, water flow, pore structure, in the durability of concrete structures;

Identify the methods by which the durability of concrete can be enhanced;

Identify the factors that cause the weathering of stone in buildings;

Explain the interventions appropriate to specific cases of stone masonry
CNM3801 - Contract Administration and Management

This study-unit will provide more depth to the study of management in the construction process. It will focus on

(1) Forms of Contract and Adjudication
(2) Cost Estimating and Tendering Cost Control
(3) Health and Safety Issues on Site

Study-unit Aims

The objective of this study-unit is to introduce elements of contract administration and site construction management. The forms of Contract and the processes leading to the adjudication of bids and award of contracts will be introduced. The preparation of Bills of Quantity will be followed by the introduction of cost estimating, and techniques of tender cost control identified. Health and safety issues on site will be introduced.

Learning Outcomes

By the end of the study-unit the student will be able to:

Understand the difference between different forms of Contract;

Explain the process of Contract adjudication;

Understand the principles behind elemental cost estimating in Bills of Quantity;

Understand the significance of cost control and the techniques used to achieve it;

Identify the health and safety issues on a typical construction site.
EVD3501 - Advanced Lighting Design

This study-unit is part of a series that address the environmental performance of buildings. Lighting, both natural and artificial, is a very important component of the environmental comfort within a building. The study-unit will consist of a series of lectures, laboratory experimental work, and simulation software demonstration sessions, intended to inculcate into students the importance of a scientific approach to the design of lighting.

Study-unit Aims

This study-unit takes students into the more advanced, scientific aspects of lighting design, including daylight prediction models, and design of artificial lighting schemes. As far as daylighting lighting is concerned, the study-unit will address the characteristics of glazing and shading schemes, the different strategies that can be adopted to enhance daylighting. Students will use models in simulated sky-rooms and sun-path models, to study daylighting levels, as well as the use of software to simulate, and calculate, daylighting levels in buildings. As far as concerns artificial lighting, students will be introduced to methods of designing artificial lighting schemes, to types and characteristics of light sources, as well as to intelligent lighting, the integration of lighting systems into building design, and the main features of lighting control systems.

Learning Outcomes

By the end of the study-unit the student will be able to:

Predict the effect of aperture design and layout on the daylighting inside buildings;

Understand the effect of the characteristics of glass on the daylight inside buildings;

Assess and apply various strategies for the efficient daylighting of buildings;

Choose appropriate light sources and their distribution for artificial lighting schemes;

Identify the lighting control systems that are available and apply them to specific design problems.
EVD3502 - Advanced Acoustics Studies

This study-unit is part of a series that address the environmental performance of buildings. The acoustical performance of building enclosures is a very important component of the environmental comfort within a building. The study-unit will consist of a series of lectures, laboratory experimental work, and simulation software demonstration sessions, intended to inculcate into students the importance of a scientific approach to acoustics.

Study-unit Aims

This study-unit takes students into the more advanced, scientific aspects of acoustics and sound insulation, including room acoustic prediction models, and design of sound insulation systems. The study-unit will address the characteristics of sound insulation materials, the different sources of sound penetration that need to be addressed to achieve appropriate acoustic protection, as well as strategies that can be adopted to modify room acoustics, and to mitigate sound transmission. Students will use software to predict reverberation time within spaces, and to design noise transmission mitigation systems.

Learning Outcomes

By the end of the study-unit the student will be able to:

Predict the effect of different surfaces and materials on the acoustics of rooms, including reverberation;

Understand the mechanisms of sound transmission, through the structure, and through the air, so as to be able to adopt the appropriate mitigation strategies;

Understand the nature and characteristics of noise, including traffic noise, machine noise, environmental or community noise;

Identify the sound control systems that are available and apply them to specific design problems.
MME3421 - Degradation of Building Materials 2

This study unit covers coursework related to the degradation of construction materials, specifically metals (steel, copper, aluminium and their respective alloys), polymers, glass, ceramics and bituminous products. Ways of mitigating the degradation phenomena are also briefly discussed. The emphasis of course material will be on electrochemical corrosion phenomena.

Study-unit Aims

This study unit aims to provide a basic understanding of:

(a) aqueous corrosion processes pertaining to a number of important metals employed in the construction industry.

(b) physico-chemical degradation of ceramics, glass and polymeric materials used in building and construction.

Learning Outcomes

By the end of the study-unit the student will be able to:

- Explain basic terminology and concepts related electrochemical corrosion of metals.
- Describe conditions that potentially lead to accelerated/uncontrolled corrosion in metals e.g. pitting and crevice corrosion.
- Outline basic methods of mitigating aqueous corrosion degradation in metals.
- Explain basic physico-chemical processes leading to the degradation of the following non-metallic materials: glass, ceramics and organic polymers.
CVE3412 - Steel Construction Technology

This study unit focuses on the technologies of producing steel structures, from the constituent materials, to fabrication and assembly technologies, and to the corrosion/fire protection and finishing processes.

Study-unit Aims

The objective of this study-unit is to introduce steel construction technology to eventual architects, engineers and construction managers. It addresses the various types of steel used in structures, and the various processes of fabrication, and of connection, including welding and bolting. Various steel structure assembly and construction processes are described. The different systems of corrosion protection, of fire protection and of finishing are explored. The objective is for students to understand the processes of steel construction so as to be able to prepare appropriate material and process specifications, as well as to be able to design steel structures, whilst taking into consideration the characteristics, potential and limitations of the material.

Learning Outcomes

By the end of the study-unit the student will be able to:

Explain the effect of the constituents, and production processes of steel, on the mechanical, physical, and fabrication properties;

Identify the different steel elements available for construction, and the systems of connection available;

Identify the different systems of assembly/construction available for steel structure;

Understand European and international standards for the production, and handling of steel and of steel construction;

Identify the processes, labour content, and plant required for the production of steel structures, so as to be able to quantify the effort and resource cost involved;

Understand the principles behind corrosion processes and effect of fire, and the techniques available to mitigate the effects on steel structures.
CVE3611 - Theory of Structures 1

The study-unit consists of a series of lectures and tutorials focusing on the structural analysis of statically determinate linear and two-dimensional structures using the equations of static equilibrium.

Study-unit Aims

The study-unit focuses on the analysis of statically determinate linear and two-dimensional structures using the equations of static equilibrium. The course aims to provide methods for establishing the bending moment, shear and deflection values of statically determinate structures, including pin-jointed trussed systems, to introduce engineering beam theory and the relative differential equations, to introduce the use of influence lines, and the analysis of three-pinned portal frames, trussed structures, and curved elements such as arches and spherical shells.

Learning Outcomes

By the end of the study-unit the student will be able to:

Understand the static equilibrium of the overall structure and its components, and reactions;

Distinguish between determinate and indeterminate structures;

Understand the behaviour of linear frameworks, in bending, and in simple compression-tension systems;

Understand axial forces, moments and shear forces in single members, and the associated deformations;

Understand the principle of superposition.

Understand the equations of bending using simple engineering beam theory;
CVE3612 - Structural Design 3

This study-unit is a course of lectures addressing the detail design, particularly of junctions between elements, in steel or reinforced or prestressed concrete.

Study-unit Aims

The study-unit aims at completing the series of study-units addressing the design of bending and compression-tension elements, particularly in structural steel, and reinforced and prestressed concrete elements. The forces that act at the connections between steel elements will be explained, and the connecting elements, such as welding and bolting, designed. The principles of detailing in reinforced concrete and masonry structures will be discussed, so as to ensure the integrity of structures. Simple concepts of prestressing of concrete will be introduced, with particular reference to pretensioned elements.

Learning Outcomes

By the end of the study-unit the student will be able to:

Understand the forces that act at the junctions between structural elements, particularly in the connections in steelwork;

Understand the principles of reinforcement detailing in reinforced concrete, particularly in continuous beams and slabs;

Understand the overall behaviour of structures, so as to identify the requirements in respect of robustness, lateral stability, and resilience;
CVE3613 - Theory of Structures 2

The study-unit consists of a series of lectures and tutorials focusing on the structural analysis of statically indeterminate linear and two-dimensional structures using the principles of equilibrium and geometrical compatibility.

Study-unit Aims

The study-unit focuses on the analysis of statically indeterminate linear and two-dimensional structures using equations of equilibrium and of geometrical compatibility. The course aims to provide methods for establishing the bending moment, shear and deflection values of simple statically indeterminate structures, such as continuous beams, rigid frames, and vierendeel girders. The course also aims at introducing students to

- approximate methods of analysis of indeterminate structures,
- approximate methods of analysis; Qualitative structural behavior,
- plastic analysis of indeterminate structures.

Learning Outcomes

By the end of the study-unit the student will be able to:

- Understand the principles behind the solution of indeterminate structures;
- Explain the basis of classical methods of manual analysis, such as moment distribution, as applied to continuous beams, and portal frames;
- Explain the basis of the reciprocal theorem;
- Understand the approach to matrix methods of structural analysis;
- Explain the use of energy theorems, and the concepts of virtual work.
- Explain the difference between elastic and plastic methods of analysis.
- Understand the basis of approximate techniques of analysis.
CVE3621 - Geotechnical Engineering 1

This study-unit comprises a course of lectures introducing the general behaviour of ground, structure-bearing, materials. The lectures will be supplemented by site visits.

Study-unit Aims

This study-unit introduces the basic concepts of granular behaviour in soils, including grading, void ratio, and moisture content. It introduces the concepts of effective stress, and of failure criterion of soils. The use of the Mohr Circle construction in describing the behaviour of soils will be explained. The students will be introduced to the concept, measurement and significance of the permeability of soils, the meaning of drained and undrained strength and states, and the meaning of consolidation. These elements will allow students to understand the basic characteristics of soil, as it interacts with loads applied by overlying structures - and hence informs the design of foundations of structures.

Learning Outcomes

By the end of the study-unit the student will be able to:

Describe the characteristics of a granular soil;

Understand the meaning of a Mohr circle construction describing the stress state of a soil;

Understand the significance of water in the soil, and the concept of effective stress, as well as the effect of permeability on the flow of water in the soil;

Predict the difference in behaviour of drained and undrained soil conditions;

Understand the significance of consolidation in the behaviour of soils
CVE3622 - Geotechnical Engineering 2

This study-unit comprises a course of lectures introducing the techniques of ground investigation. The lectures will be supplemented by site visits.

Study-unit Aims

This study-unit introduces the students to the understanding of the site, in terms of geo-technical investigations intended to facilitate the design of foundations, or the prediction of soil behaviour.

Learning Outcomes

By the end of the study-unit the student will be able to:

Describe the elements of a geotechnical investigative process, and its timing;

Understand the significance of a desk study, and the walk-over survey in a geotechnical investigation;

Understand the principles under-pinning basic site and laboratory testing techniques;

Understand the elements of a geotechnical investigation report.
SPI3711 - Urban Design Theory and Practice

This study-unit introduces the basic concepts that can equip students with the basic fundamental knowledge, principles and concepts of urban design. A sound knowledge of theory is a key pre-requisite for a complete understanding of urban design. Urban design continues to develop in this day and age as it faces new and ever-changing challenges. Knowledge of contemporary urban design theory and practice is therefore equally required. In order to achieve the above, the module comprises theory, knowledge and practice-orientated teaching and is divided into two parts:

• The theoretical aspect where basic principles and elements of urban design are studied and reflected upon in detail both historically through key theoretical writings and by using contemporary case studies; and

• The design aspect where students act as designers in their own right.

The course draws on the extensive theoretical underpinning of urban design as a means to explore approaches to appraise the character of the built environment and, as a result, to forward practical proposals aimed at beneficially influencing the overall quality and liveability of urban spaces. Knowledge is imparted through a lecture course, and developed through the undertaking of project work designed to ensure the application of theory to practice. The project work includes a site visit and attendance at a series of compulsory tutorials and project reviews. Within the assigned project, students develop a deeper understanding of the three-dimensional environment that surrounds them, through undertaking an in-depth site analysis/appraisal and the generation of a master plan and accompanying ten-point strategy for a chosen urban space.

Study-unit Aims

The objectives of this study-unit are:

• To provide students with a broad albeit introductory overview of urban design theory, encompassing its visual, social, functional, perceptual and environmental dimensions.

• To provide students with the necessary tools enabling them to place urban design within the wider context of both planning and architecture.

• To illustrate the potential of design as a creative, problem-solving process.

Learning Outcomes

By the end of the study-unit the student will be able to:

• Identify and analyze specific urban design issues on-site, backed by theoretical knowledge.

• Develop key skills of an urban design project presentation and team-working.
SPI 3721 - Introduction to the Maltese Planning System

This study unit will introduce the students to the workings of the Maltese Planning System. They will be examining the operations of the Malta Environment and Planning Authority (MEPA) with reference to the Environment and Development Planning Act (Chapter 504 of the Laws of Malta). The MEPA is Malta’s only ‘planning authority’, given that unlike many other countries with long-established planning traditions, lands use planning is a central government function, with the involvement local government being advisory.

In line with the definition of ‘spatial planning’ adopted in the SPI 272x study-unit, this unit will explore the relationship between the land-use plan/policy-making and development-control functions within the planning system, on the one hand, and sectoral, transport, and environmental policy-making and implementation, on the other, together with the approaches adopted to integrate the activities of the agencies responsible for specific fields.

The above will, among other things, involve the students meeting officials involved in plan- and policy-making/realisation activities of the above-mentioned agencies, with whom they will discuss the approaches adopted in different agencies and how they interact with each other.

The students will also have the opportunity to discuss the Maltese Planning System with individuals and representatives of organisations, who/which have from time to time expressed opinions regarding the same system

Through the study-unit reference will be made to:

1. specific characteristics of the British ‘family’ of planning systems, which provided the initial ideas upon which Maltese planning legislation was originally formulated, and

2. legislative/policy developments within the European Union which have had/have an impact on the Maltese Planning System.

At the end of the semester each student will present a report in which the issues raised in the different sessions will be summarised and analysed. These reports will subsequently be discussed in detail during an oral examination.

**Study-unit Aims**

To introduce the students to the workings of the Maltese Planning system, with reference to its place within the wider public administration system

**Learning Outcomes**

By the end of the study-unit the student will be able to:

have developed an understanding of the Maltese Planning system which delves beyond the partial and/or pedestrian views, which are often expressed in different contexts such as the Maltese media.
SPI 3722 - Urban and Regional Development

In this study-unit the term ‘development’ refers to the processes which contribute to quality-of-life improvements. According to this view, the principal role of spatial planning, as defined in the study-unit SPI 272x, should be the preparation and realisation of strategies/plans designed to lead to the attainment of such improvements.

This study-unit will initially focus on the literature which discusses the synergies between urban growth; urbanisation; political, economic, and cultural processes; and environmental factors. This part of the unit is intended to make the students aware of the strong linkages that exist between ‘the spatial’ and ‘the social’.

In as far as spatial planning is concerned, it is therefore essential for human development strategies to be formulated and implemented with reference to specific locations, hence the role of spatial planning as envisaged by in the European Regional/Spatial Planning Charter.

The second part of the unit will thus discuss issues connected with regional disparities and the policy frameworks which have been formulated in order for significant spatial and social inequalities to be reduced.

At the end of the semester each student will prepare a research paper in which the issues raised in the different sessions are discussed analytically with respect to specific cases. Each student's paper will subsequently be discussed in detail during an oral examination.

Study-unit Aims

To introduce the students to the types of issues and problems that modern spatial planners should expect to address.

Learning Outcomes

By the end of the study-unit the student will be able to:

have developed an understanding of the scales (from the local to the regional) of the issues and problems which can be addressed through spatial planning.
SPI3731 - Civil Engineering Hydraulics

This study-unit introduces a basic appreciation of hydrostatics and hydrodynamics, as a basis for civil engineering hydraulics and hydrology studies.

Study-unit Aims

This study-unit aims at providing students with an understanding of how fluids and their properties have a direct bearing on civil engineering structures related to water provision and disposal, road storm water systems, sewage disposal, and other basic infrastructural systems using fluids.

The course addresses the following topics: the properties of fluids, hydrostatics, hydrodynamics, energy losses, basic pipe design. It also introduces Engineering Hydrology.

Learning Outcomes

By the end of the study-unit the student will be able to:

Identify the properties of fluids that have a bearing on their impact on structures containing them, or directing them from one position to another;

Understand the basic principles under-pinning hydrostatics and hydrodynamics;

Understand the principles of basic pipe design.

Define the elements of engineering hydrology.
SPI 3732 Road Infrastructure 1

This study unit provides a basic understanding of the theory behind the planning and design of roads; as well as an introduction to the materials and methods applied in road construction. The student will learn about the principles of geometric road design, including the design of links and junctions; the design of storm-water systems and the incorporation of service utilities within the road cross-section. Furthermore, the student will be introduced to the principles of flexible pavement design; road construction material properties: namely those of soils, aggregates, bitumen and asphalt; asphalt production plants; road construction equipment and method of measurement for road works.

Study-unit Aims

The aims of the study are, to:

- introduce the theory behind the planning and design aspects of road infrastructure
- introduce road construction materials and their contribution to the science of flexible pavement design
- describe methods of construction and the specific plant used in the construction of road infrastructure

Learning Outcomes

By the end of the study-unit the student will be able to:

- have a good understanding of sight distances, visibilities and design speeds
- have a good knowledge about horizontal and vertical alignments of roads, including gradients
- understand the basic concepts behind the design of storm-water systems for the surface drainage of roads
- have a good knowledge about road construction material properties and the effects of traffic loading on the pavement performance
- have an understanding of best practice methods in road construction and be knowledgeable about the various plant and equipment in use
- have a basic understanding about the method of measurement for road works
SPI3734 - Management of Water Resources and Waste

This study-unit introduces the management of waste water and solid waste. It offers a more detailed approach towards wastewater network design and construction, towards groundwater and losses by evaporation, and towards trend analysis.

Study-unit Aims

The study-unit is intended to introduce students to the various parameters that form the hydrological cycle. The concept of hydrology is discussed within the wider concept of water resources, and within the management of water resources in a more sustainable manner. It will be shown how water resources are increasingly under threat through various phenomena, not least the issue of climate change.

It also introduces students to various concepts of environmental engineering particularly in respect of the management of waste – both solid and liquid. It is intended to focus more on the local agenda as well as to rope in concepts related to sustainable development and climate changes and which have a bearing on the appropriate management of waste.

Learning Outcomes

By the end of the study-unit the student will be able to:

Describe the hydrological cycle, and understand the measurement of precipitation, and the meaning of mass curve analysis;

Understand the mechanisms of evaporation;

Understand the effect the properties of soils have on groundwater;

Describe the main characteristics of ground water, in Malta;

Understand the meaning of hydrographic analysis.

Understand the principles of liquid waste management;

Understand the principles of solid waste management.
SPI 3735 - Road Infrastructure 2

In this project-based study unit the student will apply the knowledge accumulated through the previous two study units – SPI2732 & SPI3732 to plan and design a road project, through horizontal and vertical alignments; cross-sections; junction layouts; storm-water design; consideration of service utilities and pavement requirements. The tutorials will lead the student through the whole process of site analysis, traffic and pedestrian surveys, the various geometric design iterations, the pavement design to cater for the forecasted traffic, to the presentation of a complete set of road infrastructure drawings.

Study-unit Aims

The aims of the study are to:

- provide the student with practical sessions, where the theoretical knowledge acquired in the previous study units is applied to a particular real life case study.

Learning Outcomes

By the end of the study-unit the student will be able to:

- have a good understanding of the way in which road infrastructure drawings are presented
- have a good understanding of all the features which need to be cross-referenced between drawings, specifications and Bills of Quantities