

SUSTAINABLE CONSTRUCTION – PRINCIPLES, TOOLS AND METHODS **ERASMUS INTENSIVE PROGRAMME** 

# CYPRUS-SUMMER 2011





**Education and Culture DG** 



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# Introduction

Sustainability is a key element to all fields of economic and social activity in Europe. Since the Brundtland Report, sustainability has achieved global political acceptance. The Construction Industry, being one of the most important consumers of energy and raw materials as well as one of the greatest producers of solid waste, cannot ignore requirements of sustainable development any longer. Further, the ongoing discussion about climate change and the need for the prudent management of resources put additional pressure on the immediate implementation of the principles of sustainable construction.

Most university curricula for civil engineers so far do not include the required knowledge, in a sufficient way, and it is expected to take quite longer until all the knowledge needs for Sustainable Construction are implemented in the undergraduate programs for engineers at universities worldwide.

Despite the fact that the curricula of undergraduate students in most universities worldwide contain key elements and basic knowledge on concepts that could feed into the topic of Sustainable Construction, what remains absent are the links and the specialized knowledge that can bring seemingly disparate pieces of information under the common umbrella that this IP seeks to introduce. For example, in existing Civil Engineering curricula, students take courses in such areas as Construction Materials, the Design of Structures, in Environmental Engineering, and, possibly, in Energy Management. However, there are no specific courses that can clearly provide students with the essential interconnections and the vital perspective that would direct their efforts and focus, in their future role as practicing engineers, towards a more sustainable way of planning, designing, constructing, operating / maintaining and "disposing off" of structures.

This IP not only seeks to bridge these gaps for participating students, but it also seeks to facilitate discussions and exchanges amongst faculty members (i.e. instructors) in a way that will eventually lead to the incorporation of similar course(s) in the respective curricula at their institutions. The desired end-point would ideally be that partner institutions will act as models for other European Universities in their effort to incorporate, or upgrade the inclusion of, the concepts of sustainability in the fields of Civil Engineering and Construction.

Sustainability is a common theme in all fields of activity in Europe. The Construction Industry, being one of the key players in EU's economic activity, cannot ignore requirements of sustainable development any longer, especially in view of the pressing issues of climate change and the need to better manage resources. Further, most university curricula, for civil engineers, so far do not include the required knowledge, in a sufficient way, and it is expected to take quite longer until all the knowledge needs for Sustainable Construction are implemented in the undergraduate programs at universities worldwide.

# **Objectives**

The main objective of this Intensive Program is to convey to participants the principles and tools regarding the application of the basic principles of sustainability in the life cycle of buildings.

Through the proposed IP we will explore the meaning of sustainability (as this may be applied in the construction sector) and examine how we design, build, use, and decommission buildings so as to ensure a more fruitful contribution towards curbing climate change and towards a more rational use of our resources.

During the course we will address issues such as sustainable planning and design, the interactions between people, the environment and buildings, and the relationship between technology and sustainability.

Some of the **specific aims and objectives** of the proposed IP are the following:

For students to

- 1. understand the current drivers behind the building and construction sector
- 2. understand the implications of the European commitments to sustainable construction
- 3. be exposed to the modelling techniques that are used in the design of sustainable buildings
- 4. appreciate the complexities of balancing economics with technical and environmental performance and architectural function and aesthetics.
- 5. couple technical and disparate information received through their respective academic curricula to align themselves with the perspective of sustainable development
- 6. appreciate the shifting attitudes in European markets regarding the balance between traditional building techniques, new low carbon technologies and regulatory need for improved sustainability.
- 7. be exposed to a new culture and historical as well as current practices in construction

Further, with regards to instructors, we expect that by the end of this IP, we will be able to

- 1. identify the framework and set the bases through which we will try and introduce Sustainable Construction in the core curricula of our respective institutions
- 2. create a tightly-knit network of collaborators that will act as the nucleus of a vibrant research team that will be able to answer Europe's needs in the field

# Target groups

The Programme addresses undergraduate students from Civil and Environmental Engineering, or other related fields. The multidisciplinary nature of this IP should appeal to a wide audience of students, who, however, should be steeped in technical / engineering sciences. Further, this IP seeks to connect faculty members from different countries for an exchange of ideas / practices that would eventually lead to the introduction of "Sustainable Construction" in the undergraduate curricula of their respective institutions.

A maximum of 35 students (5 from each participating country) can attend this IP-course.

# Main activities

During the IP, students and faculty will participate in a rich array of activities, such as

- 1. <u>In-class instruction</u> of basic concepts and principles,
- 2. <u>Hands-on activities</u> for honing of skills attained in class,
- 3. <u>Guest lectures</u> from high ranked government officials and other stakeholders,
- 4. <u>Project</u> development as a means of implementing/practicing learned material,
- 5. Final <u>Examination</u> as a means of evaluating the effectiveness of the IP,
- 6. Educational <u>site visits to points of interest for the Construction industry</u>, and
- 7. <u>Social activities</u> that will reinforce camaraderie and better facilitate cultural exchanges.

#### Expected learning outcomes

# Expected learning outcomes

On completion of the course, participants will be able to

- 1. appreciate modern construction from an environmental context
- 2. understand the regulatory and political drivers behind the construction sector and how these drivers are likely to shape the future of design for sustainable construction
- 3. understand energy, water, and materials usage in modern domestic buildings, and how building form and construction solutions effects energy performance
- 4. understand the new market opportunities for sustainable building technologies
- 5. be exposed to analysis techniques which are essential for credible building performance analysis
- 6. experience case studies from different countries that share significant similarities but also enjoy differences
- 7. perform basic calculations on total energy use and greenhouse gas emissions associated with buildings, including both the embodied



This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

#### Contact us:

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7, Yianni Frederickou Str. Pallouriotissa 1036 Nicosia Cyprus

Phone: +357-22-345158 (Ext. 147) Fax: +357-22-438234 E-mail: <u>c.anastasiou@frederick.ac.cy</u>

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# **COURSE TEAM UNIVERSITIES & INSTRUCTORS**

Six universities, from six different countries of the EU, are participating in this Program (please scroll down for details)

To visit the official website of each institution, please **click on the respective logo**.

Also included is a list of short biographical sketches of the instructors participating in SUSCON Cyprus 2011.

# **CYPRUS**

# Frederick University **Dept of Civil Engineering** (Organizing Institution)

**Dr. Christos Anastasiou** holds a BS and an ME degree in Environmental Engineering, as well as a Graduate Diploma in Wetlands and Hydrology, from the University of Florida. He received his PhD in Civil Engineering (Environmental Systems Analysis) from North Carolina State University. His 12-year-long experience in the field of environmental engineering spans the worlds of both academia and industry. Before joining the faculty of Frederick University, he worked as a consultant in the US, Cyprus, and Lebanon, as a Scientific Officer at the Research Promotion Foundation in Cyprus, as an Assistant Professor of Environmental Engineering at the American University of Beirut in Lebanon, and more recently as the Academic Director of the Postgraduate Program at the Cyprus International Institute for the Environment and Public Health in Association with Harvard School of Public Health. He also holds an Adjunct Lectureship of Environmental Engineering with the Harvard School of Public Health. His current research interests focus on mathematical programming / optimization, decision support systems, and engineering decision-making, especially as these apply to wastewater treatment and reuse, agricultural waste management, sustainable development, and renewable energy resources. He has taught courses on such topics as Environmental Management and Technology, Construction Management, Wastewater Engineering, Environmental Engineering and Fluid Mechanics / Hydraulics, at both the Undergraduate and Graduate levels, in four universities, worldwide.

Dr. Anastasiou is the Coordinator of the SUSCON IP. He will be lecturing on such topics as Sustainability, Water Issues in Sustainable Construction, and on Life Cycle Costing.

# To contact Dr. Anastasiou

E-mail: c.anastasiou@frederick.ac.cy



Dr. Demetris Nicolaides is a Lecturer of construction materials science in the Department of Civil Engineering. He has published research work in the field of high performance cementitious composites, including both material development and experimentation and modelling of the constitutive behaviour using non-linear fracture mechanics theories. Demetris also teaches the subjects of Construction Materials, Strength of Materials, Statics and Concrete Design.

His contribution to the proposed IP will include the coordination of certain activities for the Program, as well as lectures on Construction Materials and Sustainability, as well as case studies from Cyprus.

# **To contact Dr. Nicolaides**



### To contact Dr. Nicolaides

E-mail: d.nicolaides@frederick.ac.cy



**Dr. Stratis Kanarachos** holds a PhD in Mechanical Engineering from the National Technical University of Athens, Greece (NTUA). Currently, he is an Assistant Professor in the Department of Mechanical Engineering (ME) at Frederick University. Prior to his current appointment he worked as a research associate at NTUA and TEI Piraeus for five years in the development of integrated design and production technologies. Subsequently, he worked for two years at Frederick Institute of Technology as a lecturer in the ME Department. He is a member of the Technical Chamber of Greece and of the Hellenic Association of Mechanical Engineers. He holds a patent for the development of an efficient & cost effective building system for the construction of Low Energy Buildings. He has strong relations with local and European industries. He is an invited reviewer for Inderscience Publishers and WSEAS. Since obtaining his degree he has been actively involved in more than 15 funded research projects, as the PI and Scientific Coordinator. His research interests primarily lie in the field of Engineering Design & Optimisation. His work focuses on integrated design and production technologies, developing efficient numerical models on the basis of the Finite Element Method with applications in engineering and the application of hybrid optimisation techniques for the efficient solution of engineering problems. His contribution to the proposed IP will include the teaching of Energy Issues concerned with Sustainable Construction processes.

#### To contact Dr. Kanarachos

E-mail: eng.ks@fit.ac.cy



**Dr Petros Christou** is an Assistant Professor at the Department of Civil Engineering of Frederick University. His area of specialization is nonlinear structural analysis, computer aided structural analysis and software development. Dr Christou has been involved in the development various software packages related to structural analysis and bridge pier foundations. He has taught courses related to structural analysis and he has also taught workshops for the analysis of bridge piers and their foundations in various places in the United States. Dr Christou also has practical experience and he is the consultant engineer of various structural engineering projects. He is a registered professional engineer with the Technical Chamber of Cyprus and a member of various professional associations. He holds the title of the European Engineer (EurIng).

To contact Dr. Christou

E-mail: eng.cp@fit.ac.cy



**Dr Antonis Michael** is a lecturer of structural and material engineering in the Department of Civil Engineering. His research work includes load testing of bridges, structural concrete design and testing, long term monitoring of structures in the field, repair/strengthening of wood structures with fiber reinforced polymers (FRP), instrumentation and testing of wood structures, characterization and testing of FRP materials, repair/strengthening of concrete structures with FRP and new reinforcement materials for structural concrete. Antonis teaches the subjects of construction materials, measurement of works, statics, highway design, and advanced courses in reinforced concrete design.

To contact Dr. Michael

E-mail: eng.ma@fit.ac.cy

ITALY

<u>University of Rome, Tor Vergata</u> Dept of Civil Engineering





**Dr. Renato Baciocchi** is Assistant Professor of Environmental Engineering at the University of Rome Tor Vergata since 2003. He received a Ph.D. in Chemical Engineering by the Politecnico di Milano in 1995 and worked for a few years as process engineer before statistic process and of 100%. Use main research interacts for use of the statistical statisti



by the Politecnico di Milano in 1995 and worked for a few years as process engineer before starting his academic career at the end of 1998. His main research interests focus on remediation of contaminated sites and carbonation of waste materials for carbon dioxide capture and storage. His role in the IP project will consist in lecturing on waste and water issues and sustainable construction materials.

### To contact Dr. Baciocchi

E-mail: baciocchi@ing.uniroma2.it



**Dr. Francesco Lombardi** is Associate Professor of Environmental Engineering at the University of Rome Tor Vergata since 2005. He received a Ph.D. in Environmental Engineering by the University of Rome La Sapienza in 1996 and worked for a few years as technical director of the incinerator plant located in Rome, before starting his academic career at the end of 1998. His main research interests focus on waste management and waste treatment. His role in the IP project will consist in lecturing on waste and water issues and sustainable construction materials.

To contact Dr. Lombardi

E-mail: TBA

# **SPAIN**

University of Seville Dept of Agroforestry Engineering





**Dr. Luis Pérez Urrestarazu** is a Lecturer at Seville University (Spain). He holds a BS Degree in Agricultural Engineering from the University of Cordoba, he is an Advanced Technician in Occupational Risks Prevention (from Esculapio Foundation), and he received his PhD in Agricultural Engineering from the University of Cordoba in 2007. He was a visiting researcher in academic institutions in the UK and in the Netherlands. He has taught courses in Hydraulics and Irrigation Engineering, and has participated in a number of European projects. His research interests focus on two main areas; Water management for irrigation - Performance indicators, energy saving, networks' analysis and Urban greening - development of green roofs and vertical gardens, as well as on ecological systems to improve air and living conditions and reduce energy consumption. His contribution to the project will include lectures on Sustainability, water issues in sustainable construction and on Urban Greening concepts.

# To contact Dr. Pérez Urrestarazu

E-mail: lperez@us.es



**Mr. Rafael Fernández Cañero** is a lecturer at Seville University (Spain) teaching Gardening technology and Landscaping and Garden and Parks Maintenance at the Technical School of Agricultural engineers. He is an Agricultural engineer and he is doing his Ph.D. at Seville University on Urban Greening technologies. He did a research stay in Swedish University of Agricultural Sciences, Alnarp (Sweden). His contribution to the IP will include lectures on urban greening concepts as well as case studies from Spain.

To contact Mr. Fernández Cañero

E-mail: TBA

# PORTUGAL



# Algarve University Dept of Civil Engineering





**Dr. Fatima Farinha** holds a Diploma in Civil Engineering (Structures), a Master Degree in Construction and a PhD in Civil Engineering from Technical University of Lisbon (Portugal). From 1986 to 1988 she was assistant at the civil engineering department in Technical University of Lisbon. Since 1988 she is working at the civil engineering department in Algarve University, at the moment as coordinator professor. She has 50 papers published in journals and conferences (international and national). Her current research interests are on sustainable construction/energy efficiency in buildings/intelligent buildings/ development and verification of data standards for AEC and systems' interoperability. She has taught courses on buildings and construction with special emphasis on energy efficient and energy performance certificates at both undergraduate and graduate levels. Her contribution to the proposed IP will be lecturing on construction and energy issues.

#### To contact Dr. Farinha

E-mail: mfarinha@ualg.pt



**Ms. Vera Rocheta** holds a Diploma in Civil Engineering (Structures) from Algarve University (Portugal) and she is now a Master student in Civil Engineering (Hydraulics). Since 2006 she is working at the civil engineering department in Algarve University, at the moment as assistant. She has 4 papers published in national and international conferences. Her current research interests are on water efficiency and sustainable construction. She has taught courses on such topics as Hydraulics and Wastewater Treatment. Her contribution to the proposed IP will be lecturing case studies from Portugal.

To contact Ms. Rocheta

E-mail: TBA

# GREECE

# Alexander Technological Educational Institute of Thessaloniki Dept of Civil Infrastructure Engineering





Dr Dimitrios Konstantinidis holds a Diploma in Civil Engineering from the Aristotle University of Thessaloniki, Greece, and an MSc in Concrete Structures as well as a PhD from Imperial College London. He has a 17-year-long experience in reinforced and prestressed concrete structures including research, design, construction and maintenance. Prior to taking up his current academic position as Associate Professor at the Alexander Technological Educational Institute of Thessaloniki, in the Department of Civil Infrastructure Engineering, he was employed by Egnatia Odos S.A., the client organization responsible for the management of the design and construction of the European Union funded 670 km long Egnatia Motorway in Northern Greece (€7.6 billion project), as a bridge engineer for the design, checking and construction of medium and large bridges in seismic areas. He is a member of fib Task Group 7.5 "Seismic design of buildings incorporating high performance materials" and has been appointed three times as National representative in the Technical Committee D3 "Road Bridges" of the World Road Association (PIARC). His current research interests lie in the field of analytical and experimental research on high performance materials, design and maintenance of bridges, behaviour of high rise buildings in seismic areas and environmental protection. He has taught courses on bridge engineering, reinforced concrete structures, structural analysis and landscape restoration. His contribution to the proposed IP, will be three lectures on Design of Sustainable Bridges, The utilisation of high performance materials in the construction industry, and a Case Study from Greece "The design and construction of Egnatia Motorway".

#### To contact Dr. Konstantinidis

E-mail: dkon@cie.teithe.gr

# MALTA

# University of Malta Faculty for the Built Environment





Mr. Kevin Gatt graduated from the University of Malta with the degree of Bachelor of Architecture and Civil Engineering after which he pursued his Master of Science studies in Hydrology for Environmental Management at Imperial College London. Mr Gatt also holds a Master in Business Administration from the University of Malta. Mr Gatt is a consultant for the Government of Malta as well as a member of the academic staff of the Faculty for the Built Environment where he is responsible for lecturing in water resources and waste management whilst also covering the disciplines of sustainable development and climate change. Mr Gatt has undertaken various policy and feasibility studies in order to develop environmental systems on a national platform. These included the reform of various entities, the financial assessment of waste management options and chairing the drafting process for Malta's revised waste management strategy consultation document. He has also acted as national water demand consultant for FAO whilst authoring the water resources portion of Malta's communications to the UNFCCC. Mr Gatt chairs the Registration Board which is responsible for the registration of environmental consultants and also held the chair of Malta's competent authority for Strategic Environmental Assessment. His contribution to the proposed IP will include lectures on Water Issues in Sustainable Construction, Waste Management, and case studies from Malta.

### To contact Mr. Gatt

E-mail: kevin.gatt@um.edu.mt

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# VENUE

# **INTRODUCING CYPRUS**



"Floating on the waters of the European Mediterranean, but pointing longingly towards the shores of Syria, Turkey and Lebanon, Cyprus is an odd mixture. It is a kaleidoscopic blend: its cultural influences are dominated by Western Europe, but its geographic proximity to Asia and Africa gives it more than just a hint of the East. Long coveted by mainland Greece and Turkey, this small island has its own definite and beguiling character.

Whether you know it as the 'island of sin' (or 'fun') thanks to wild stories from Agia Napa; the country that entered the EU only as a half; or, as the tourist brochures love to point out, 'the island of Aphrodite', Cyprus both confirms and confounds the stereotype. Parts of Cyprus have been overrun by keen developers who (depending on who you're talking to) have either 'sold the country's soul' or 'are bringing great wealth to the island'. Whatever the truth, in the tourist centres of places like Pafos, Agia Napa, Protaras, or Lemesos (Limassol), you might feel as if you've entered a sunny, scorching Essex suburb with lobster-red Brits letting it all hang loose with a lukewarm can of Foster's in tow. But if curiosity draws you out of the cities, you'll discover the small villages of the Akamas Peninsula. Walk the gorgeous Troödos or climb to the medieval castles with their shimmering island views. Wander through the sea of wildflowers covering the island in spring, and Cyprus will take your breath away. With good walking shoes, a swimsuit and some sunscreen in your bag, you can have a trip you'll remember for years."

Quoted from the Lonely Planet on line (<u>http://www.lonelyplanet.com/cyprus</u>)

**Education and Culture DG** 

Lifelong Learning Programme

Τ ΤΔΕΓ Διά Βίου Μάθησης

For a more detailed introduction to Cyprus, please visit the official website of the Cyprus Tourism Organization of the Republic of Cyprus

# VENUE





The venue of the Meeting will be the <u>Adelais Bay Hotel</u>, which is located in the coastal tourist resort of <u>Protaras</u>, which belongs to the <u>Municipality of Paralimni</u>, in the eastern part of Cyprus.

# **HOW TO ARRIVE**

Cyprus can be reached by air through the airports of Larnaca and Paphos.

The <u>airport of Larnaca</u> is the preferred airport for easier access to the course venue.

Protaras Beach (i.e. Adelais Bay Hotel) is located about 47 Km from Larnaca airport.

Although you can get a bus to reach Protaras Beach from Larnaca Airport, the bus schedule may be rather inconvenient. A shared taxi may be a better arrangement for groups of 3-4 people.

The cost of a taxi (one way) from the airport to Protaras is approximately €60

Also, you can contact a company from which you can book a shared mini-bus, given that enough people arrive together. One example of such a company can be seen at <a href="http://www.cyprusjourneys.com/transfers.html">http://www.cyprusjourneys.com/transfers.html</a>

### **IMPORTANT TRAVEL COST NOTE:**

The Program can cover travel expenses incurred.

Specifically, the program can cover the **REAL COST** of your eligible travel costs (i.e. air fare and certain ground transport), **but up to a certain maximum**, depending on your point of origin.

The table below provides this maximum amount that can be covered for travellers from different countries:

	COUNTRY	RATE (in EUR)
EL	Greece	300
ES	Spain	650
IT	Italy	550
MT	Malta	400
PT	Portugal	700

Therefore, if the roundtrip air ticket to and from Cyprus costs a traveller from Spain 600EUR, that person will be reimbursed at the amount of 600EUR and NOT the maximum allowable of 650EUR. If the roundtrip air ticket cost someone from Greece 370EUR, the amount that is to be reimbursed by the Program will be only 300EUR and NOT the full amount spent.

Ground transport may be eligible for reimbursement by the project. **Use of PRIVATE TAXI is EXCLUDED**. Use of train, shared mini-bus, shuttle, or bus can be reimbursed though (you must remember to keep—and submit—pertinent receipts).

The total air fare plus ground transport expenses cannot exceed the maximum amounts indicated in the table above. You can receive only the eligible costs of the maximum amount indicated.

indicated in the table above. You can receive only the eligible costs of the maximum amount indicated.

TO BE REIMBURSED FOR ANY of the above-mentioned expenses, you **MUST PROVIDE ALL RECEIPTS AND BOARDING PASSES** of your travel to Dr. Christos Anastasiou (c.anastasiou@frederick.ac.cy)

# WHERE TO STAY & EAT

Cyprus, as a summer tourist destination is rather expensive.

The Erasmus IP funds, for Cyprus, limit subsistence costs (i.e. room and board), for students, to only 19EUR per day.

In an attempt to reduce costs for the Program, we decided to manage the Project's funds centrally, for students and instructors alike.

Having done so, allowed us to secure room (shared two bed units with private bathrooms for students) and full board at Adelais Bay Hotel for the duration of the course (i.e. arrival on July 17th and departure on August 1st, 2011).

# **IMPORANT NOTE:**

To help cover the aforementioned costs, each student will have to pay the amount of **300EUR** to the Program's Organizing Committee. For further details, please consult the web-page on <u>"Fees & Regulations"</u>

With the above contribution, we will manage to also cover the cost of four field trips (educational & social) on the island, as well as a dinners at a traditional music tavern.

# WHAT TO DO while in Cyprus

STUDY!!

Well, not quite (at least not only!...)

Cyprus is a happening place. Especially coastal resorts, during summer.

You can always search for more information on Cyprus / Protaras / Paralimni on the Worldwide Web. However, trust me, if I were at your age (not that I am all that old, or so I would like to think), this is the place where I would have liked to be during the summer (nice beaches, sun, music, history galore, interesting culture, good food, etc.). Besides, the planned field trips will allow us an additional glimpse of the Island as well.

# WHAT TO BRING with you

We believe that the following are some items that you can bring with you. Items in RED color are imperative for successful participation in the course.

#### LAPTOP COMPUTER

- CREDIT CARD (for incidentals and for Hotel Room Security Deposit) also, Cyprus can be an expensive destination at certain places.
- Comfortable clothes and shoes (Cyprus gets exceptionally hot during summer

- Comfortable clothes and shoes (Cyprus gets exceptionally hot during summer months)
- Specialized Medication (if it applies) & Personal-care items
- Hat, sunscreen, Bathing suit (?)



This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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<b>Dr. Christos Anastasiou</b> Department of Civil Engineering Frederick University
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Fees & Regulations	For students of ERASMUS IP Partner Universities:			
Application Information	300.00 EUR			
Course Calendar				
Material	The course is funded by the Erasmus Intensive Program (Erasmus IP). Students and individuals not belonging to one of the Universities mentioned in the " <u>Course Team</u> " page,			
Contact us	cannot participate in this course.			
Related Links	The participation fee covers the following:			
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	Accommodation in a 3* Hotel in Protaras Coastal Resort, in Cyprus			
	• Students will have to share a room (2 beds + private bathroom) with another of their classmates. Roommate arrangements will be made when registration is complete.			
	3 Meals per day (Breakfast / Light Lunch / Dinner)			
	Two Educational Field Trips			
	Two Educational / Social Field Trips			
	Dinner at a Traditional Music Tavern			
	Certificates of Completion of the course			
	The reason why an extra fee is charged for students is due to the fact that the subsistence amount that the funding agency allows for students is only 19EUR per day. This amount is not sufficient to cover accommodation and meals, in any way. Central management of funds made it possible that we secured a much better rate, than we could otherwise have had, thus making this course possible.			
	APPLICATION PROCEDURE & DEADLINES			

You should send an email to your respective University's contact person (e-mail links provided below) for further information and for an application.

In your email, you should also briefly describe why you are interested in attending this summer school and attach your CV.

# List of Contact persons (for each university):

Frederick University: <u>c.anastasiou@frederick.ac.cy</u> (Dr. Anastasiou)

University of Rome; Tor Vergata: baciocchi@ing.uniroma2.it (Dr. Baciocchi)

University of Seville: <u>lperez@us.es</u> (Dr. Perez)

Algavre University: mfarinha@ualg.pt (Dr Farinha)

University of Malta: kevin.gatt@um.edu.mt (Mr. Gatt)

Alexander T.E.I. of Thessaloniki: <u>dkon@cie.teithe.gr</u> (Dr. Konstantinides)

# Selection Criteria & Procedure

First cycle (Bachelor's level) students of Civil and Environmental Engineering, and of related fields, are expected to primarily participate in this course. The multidisciplinary nature of this IP should appeal to a wide audience of students, who, however, should be steeped in technical fields / the engineering sciences.

Postgraduate students can participate in the course (in limited numbers) and under very specific conditions such as, for example, if a graduate student's thesis/dissertation is directly associated with the topic of Sustainable Construction, and it could be demonstrated that this student will directly benefit from the specific character and structure of the proposed IP.

Further to the aforementioned criteria, participating students will be selected based on

- 1. their **expressed interest** in the subject-matter,
- 2. the level of their technical background,
- 3. **abilities and skills** that will allow them to follow lectures of primarily technical nature.
- 4. a **personal interview** with the participating faculty members from their respective institutions may be required to help better identify the most qualified student-participants.

# **COURSE RULES & REGULATIONS**

### **Course Attendance**

Students selected to participate in the course, **MUST PARTAKE IN ALL COURSE ACTIVITIES** (including classroom sessions and field-trips) set by the course instructors, and which are listed in the "<u>Course Calendar</u>" webpage. **Attendance will be taken** (a sign up sheet will be circulating in the beginning of each session of the course).

# Successful Completion of Course

To successfully complete the course, students must attend all required activities (as listed above), and successfully complete all of the required work (i.e. Homework assignments, Exams, and Projects).

To be able to follow the requirements of the course, you will need to bring along

To be able to follow the requirements of the course, you will need to **bring along with you a laptop computer**. Most of the material for the course will be in electronic format. Further, exercises that will require the use of a computer will be handed out. Your laptop will be required.

# **Regulations on Funding & Fees**

This project is funded largely through the European Commission Lifelong Learning Program.

Selected students will have to supplement their participation to the course with the amount of 300EUR.

For any of the participants to be reimbursed for travel, you will need to collect all pertinent receipts and boarding passes, and hand them over to the coordinator of the project, Dr. Christos Anastasiou, upon arrival to Cyprus.

### **IMPORTANT TRAVEL COST NOTE:**

The Program can cover travel expenses incurred.

Specifically, the program can cover the **REAL COST** of your eligible travel costs (i.e. air fare and certain ground transport), **but up to a certain maximum**, depending on your point of origin.

The table below provides this maximum amount that can be covered for travellers from different countries:

	COUNTRY	RATE (in EUR)
EL	Greece	300
ES	Spain	650
IT	Italy	550
MT	Malta	400
PT	Portugal	700

Therefore, if the roundtrip air ticket to and from Cyprus costs a traveller from Spain 600EUR, that person will be reimbursed at the amount of 600EUR and NOT the maximum allowable of 650EUR. If the roundtrip air ticket cost someone from Greece 370EUR, the amount that is to be reimbursed by the Program will be only 300EUR and NOT the full amount spent.

Ground transport may be eligible for reimbursement by the project. **Use of PRIVATE TAXI is EXCLUDED**. Use of train, shared mini-bus, shuttle, or bus can be reimbursed though (you must remember to keep—and submit—pertinent receipts).

The total air fare plus ground transport expenses cannot exceed the maximum amounts indicated in the table above. You can receive only the eligible costs of the maximum amount indicated.

**TO BE REIMBURSED FOR ANY** of the above-mentioned expenses, you **MUST PROVIDE ALL RECEIPTS AND BOARDING PASSES** of your travel to Dr. Christos Anastasiou (<u>c.anastasiou@frederick.ac.cy</u>)

# **IMPORTANT SUBSISTENCE COST NOTES:**

Accommodation and meals for ALL participants will be managed centrally.

Accommodation and meals for ALL participants will be managed centrally.

# **STUDENTS**

- Students will be housed in two-bed hotel rooms. Each room will have its own bathroom facilities.
- **Roommate assignments** will be based on gender, but, unless a special request is filed with the program coordinator (<u>c.anastasiou@frederick.ac.cy</u>), the selection of roommates will be otherwise random.

# **INSTRUCTORS**

 Instructors will be housed in single bed rooms, in the same hotel (please see <u>Venue</u> webpage).

# **ALL PARTICIPANTS**

- Three meals, per day, will be provided for each participant.
   Meals will be provided at the Hotel, unless otherwise indicated, during special events (i.e. field trips, farewell dinner, etc.)
- Extra expenses incurred (e.g. personal excursions, purchases, drinks, hotel-room damages, phone-calls, etc.), will NOT be covered through this project.

You will have to **have a valid CREDIT CARD available with you**, to present, on arrival, at the Hotel Front Desk for security-deposit purposes (i.e. for incidentals and damages that each room may incur).



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#### **Contact us:**

**Dr. Christos Anastasiou** Department of Civil Engineering Frederick University

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Phone: +357-22-345158 (Ext. 147) Fax: +357-22-438234 E-mail: <u>c.anastasiou@frederick.ac.cy</u>

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#### SUSTAINABLE CONSTRUCTION – PRINCIPLES, TOOLS AND METHODS ERASMUS INTENSIVE PROGRAMME







# **APPLICATION INFORMATION**

The Program addresses undergraduate students from Civil and Environmental Engineering, or other related fields. The multidisciplinary nature of this IP should appeal to a wide audience of students, who, however, should be steeped in technical / engineering sciences.

- A maximum of 35 students will be admitted to this IP-course.
- 1. Each institution will select their own participants (five each).
- 2. If you are interested in participating in the summer school, please send an email to the contact person of your university (contact list is provided below— scroll down).
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3. In your email, please include your CV, as well as a brief letter of interest (i.e. why do you want to participate in the Program)

# PREREQUISITES

No specific prerequisites are required to attend this Intensive Program, even though it is advisable to have basic knowledge in

- Civil Engineering Concepts (i.e. Construction of Civil Works)
- Building Materials
- Principles of Sustainable Development
- some minimal skills in using computers at user level.
- As the entire Summer School will be conducted in English, solid communication skills in listening, reading, writing and speaking the English language are necessary.

Basic prerequisites for the summer school are the following:

- Interest in Sustainable Development and Construction Projects.
- Interest to expand and share knowledge and experiences.
- Working knowledge of English

All those who want to participate the Summer School should briefly describe why they are interested in attending this summer school and attach their CV.

# FOR MORE INFORMATION & TO APPLY FOR PARTICIPATION

You should send an email to your respective University's contact person (e-mail links provided below) for further information and for an application. In your email, you should also briefly describe why you are interested in attending this summer school and attach your CV.

# Deadline for Application: 18 March, 2011

# Deadline for Application: 18 March, 2011

# List of Contact persons (for each university):

Frederick University: <u>c.anastasiou@frederick.ac.cy</u> (Dr. Anastasiou)

University of Rome; Tor Vergata: baciocchi@ing.uniroma2.it (Dr. Baciocchi)

University of Seville: <u>lperez@us.es</u> (Dr. Perez)

Algavre University: mfarinha@ualg.pt (Dr Farinha)

University of Malta: <u>kevin.gatt@um.edu.mt</u> (Mr. Gatt)

Alexander T.E.I. of Thessaloniki: <u>dkon@cie.teithe.gr</u> (Dr. Konstantinides)

# NOTE:

To participate in the Program, each student will have to pay an amount of **300EUR** to the Program's Organizing Committee. For further details, please consult the web-page on <u>"Fees & Regulations"</u>

There will be a selection from all applications depending on the number of these. If you are selected you will, soon after your application / selection, receive details about payment and the procedure to be followed.

# Selection Criteria & Procedure

First cycle (Bachelor's level) students of Civil and Environmental Engineering, and of related fields, are expected to primarily participate in this course. The multidisciplinary nature of this IP should appeal to a wide audience of students, who, however, should be steeped in technical fields / the engineering sciences.

Postgraduate students can participate in the course (in limited numbers) and under very specific conditions such as, for example, if a graduate student's thesis/dissertation is directly associated with the topic of Sustainable Construction, and it could be demonstrated that this student will directly benefit from the specific character and structure of the proposed IP.

Further to the aforementioned criteria, participating students will be selected based on

- 1. their expressed interest in the subject-matter,
- 2. the level of their technical background,
- 3. **abilities and skills** that will allow them to follow lectures of primarily technical nature.
- 4. a **personal interview** with the participating faculty members from their respective institutions may be required to help better identify the most qualified student-participants.





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### SUSTAINABLE CONSTRUCTION – PRINCIPLES, TOOLS AND METHODS ERASMUS INTENSIVE PROGRAMME





Education and Culture DG

Lifelong Learning Programme



**COURSE SCHEDULE** & CALENDAR OF EVENTS

# JULY 2011

tion	Sun	Mon	TUE	WED	Тни	Fri	SAT
						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	Arrival	Class 1	Class 2	Field trip 1	Class 3	Class 4	Field trip 2
	24	25	26	27	28	29	30
	Free Day	Class 5	Class 6	Field trip 3	Class 7	Field trip 4	Free Day
	31						
	Final Exam						
			1		1		1

# AUGUST 2011

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 Departure	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

# **DETAILED SCHEDULE OF EVENTS**

DAY	PLANNED ACTIVITY
July 17, 2011	Arrival
July 18	Welcoming Session
	Duration: 2.5 hours
	Introductions
	Faculty Members
	Students
	Guide to the course / Syllabus
	Guest Sneakers - Dr. C. Theonemptou - Cyprus Environment Commissioner
	Participants' Welcoming Lunch (1.5 hours)
	Lecture Topic 1 - Introduction to sustainability

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	Lecture Topic 1 - Introduction to sustainability Duration: 2.5 hours Lecturer - Frederick U. (C. Anastasiou), U Seville (L. Perez), U. Algarve (F. Farinha) Definitions of sustainable development Sustainability in the construction sector System analysis energy / ecology / economy
	Discussion Session (0.5 hour)
	Faculty Welcome Dinner
<b>JUIA 1</b> 8	Lecture Topic 2 - Legal framework and standards Duration: 3 hours Lecturer:- Frederick U. (P. Christou & A. Michael) <i>Guest Speakers</i> - 1. Representative of the Environment Service 2. Representative of the Technical Chamber of Cyprus Building and environmental law National and European Standards
	Discussion Session (0.5 hour) Lunch Break (1 hour)
	<ul> <li>Lecture Topic 3 – Design Issues in Sustainable Construction</li> <li>Duration: 3.5 hours</li> <li>Lecturers: – F.U. (P. Christou, B. Ioannou), U. Seville (L. Perez), TEITh (D. Konstantinidis)</li> <li>Building Products and Construction Methods</li> <li>Function and Performance of Buildings</li> <li>Design of Sustainable Bridges</li> </ul>
	Discussion Session (0.5 hour)
	Faculty Discussion Session (2 Hours)
July 20	Field Trip 1 (Educational) – Eco-friendly House Construction Company (Zebra) + Ecological Houses Site Visit
July 21	Lecture Topic 4 – Sustainability in project development and planning Duration: 2.5 hours Lecturers: – Frederick U. (A. Michael, B. Ioannou), U. Rome (R. Baciocchi) Guest Speaker – Representative from the Public Works Department Consideration of sustainability aspects in the project development phase Tenders and architectural competitions Establishing an interdisciplinary design team
	Discussion Session (0.5 hour)
	Lunch Break (1 hour)
	Lecture Topic 5 - Economical sustainability Duration: 2.5 hours Lecturer - Frederick U. (C. Anastasiou, S. Kanarachos) U. Malta (K. Gatt) Fundamentals of life cycle costs (LCC) Investment Appraisal, Capital Budgeting, Estimation of operation and removal costs
	Discussion Session (0.5 hour)
July 22	<ul> <li>Lecture Topic 6a - Sustainable Construction Materials</li> <li>Duration: 3.5 hours</li> <li>Lecturer - Frederick U. (D. Nicolaides), U. Rome (R. Baciocchi), TEITh (D. Konstantinidis)</li> <li>Basic principles of recycling materials</li> <li>Methods of energy and natural resources savings</li> <li>Utilization of waste materials and by-products of several industries in the production of construction materials</li> <li>The utilisation of high performance materials in construction industry</li> </ul>
	Discussion Session (0.5 hour) Lunch Break(1 hour)
	Lecture Topic 6b - <u>Sustainable Construction Materials</u> Duration: 2 hours Lecturer - Frederick U. (D. Nicolaides), U. Rome (R. Baciocchi) Analysis of properties and discussion of potential applications Overview of current state-of-the-art knowledge and future trends
	Discussion Session (0.5 hour) Faculty Discussion Session (2 hours)
July 23	Field Trip 2 (Educational & Social) - "The Mountain Route". This field trip's objectives will be

July 23	<b>Field Trip 2 (Educational &amp; Social)</b> – <u>"The Mountain Route"</u> . This field trip's objectives will be the following: <b>(1)</b> to introduce participants to the traditional architectural style and construction methods / materials of Cyprus (examples of sustainable construction from the past), <b>(2)</b> to allow participants the opportunity to view some of Cyprus's sights; natural and built environments, <b>(3)</b> to facilitate cultural exchanges and create an environment for better group bonding through an outdoors cookout on the Troodos mountains.
July 24	<b>Free Day</b> (NOTE: free days are meant to be used by participants in any way that they wish. They can either study / review the material introduced up to date, or they can spend their days sightseeing the country. Despite the fact that we will not offer any structured activities, we can help make arrangements if we are so asked)

July 25	Lecture Topic 7 – <u>Case Studies from Italy</u> Duration: 1 hour Lecturer – U. of Rome - Prof. Renato Baciocchi
	Lecture Topic 8 – <u>Case Studies from Spain</u> Duration: 1 hour Lecturer - U. of Seville – Prof. Luis Perez
	Lecture Topic 9 – <u>Case Studies from Greece: "The design and construction of Egnatia</u> <u>Motorway"</u> Duration: 1 hour Lecturer - Alexander TEITH – Prof. D. Konstantinidis
	Lunch Break(1 hour)
	Lecture Topic 10 – <u>Case Studies from Portugal</u> Duration: 1 hour Lecturer - U. of Algarve – Prof. Fatima Farinha & V. Rocheta
	Lecture Topic 11 – <u>Case Studies from Cyprus</u> Duration: 1 hour Lecturer – Frederick U Prof. Panicos Papadopoulos
	Lecture Topic 12 – <u>Case Studies from Malta</u> Duration: 1 hour Lecturer – U. of Malta – Prof. Kevin Gatt
July 26	Lecture Topic 13a - Construction and Energy Duration: 3.5 hours Lecturer - Frederick U. (S. Kanarachos), U. Algarve (F. Farinha & V. Rocheta) Guest Speaker - Mr. Solon Kassinis - Director of the Department of Energy energy-efficient constructions heating-, ventilation- and air conditioning technologies renewable energy
	Discussion Session (0.25 hour)
	Lunch Break(1 hour)
	Lecture Topic 13b - <u>Construction and Energy</u> Duration: 1.5 hours Lecturer - Frederick U. (S. Kanarachos), U. Algarve (F. Farinha & V. Rocheta) energy performance certificate (for buildings) thermal construction simulation
	Discussion Session (0.25 hour)
	Lecture Topic 14 – <u>Construction and Water Issues / Urban Greening</u> Duration: 3 hours Lecturer – Frederick U. (C. Anastasiou), U. Seville (L. Perez) Greywater Recycling On-site wastewater treatment, Natural treatment systems Urban greening concepts Green roofs / Vertical gardens & living walls
	Discussion Session (0.5 hour)
July 27	Field Trip 3 (Educational) – Vasilicos Cement Factory + Stone Quarry

July 27	Field Trip 3 (Educational) – Vasilicos Cement Factory + Stone Quarry	
	Faculty Dinner	
July 28	Lecture Topic 15 – <u>Restoration &amp; refurbishment</u>	
	Lecturer – Frederick U. (B. Ioannou & P. Christou)	
	restoration concepts	
	structural and physical assessment of buildings demands for handling the cultural heritage	
	Discussion Session (0.25 hour)	
	Participants' Social Lunch (2 hours)	
	Course Overview / Re-Cap Meeting	
	Duration: 2 hours	
1uby 20	<b>Field Trip 4 (Educational &amp; Social)</b> – "The Coastal Poute" This field trip's objectives will be	
July 29	the following: (1) to introduce participants to the current practices in Cyprus concerning the	
	Tourist Industry – positive and negative examples (concerning Sustainable Construction and the	
	Cyprus's sights: natural and built environments. (3) to facilitate cultural exchanges and create	
	an environment for better group bonding through a social lunch/dinner at one of the country's	
	coastal resorts.	
July 30	Free Day (NOTE: free days are meant to be used by participants in any way that they wish.	
	They can either study / review the material introduced up to date, or they can spend their days	
	help make arrangements if we are so asked)	
July 31	Final Exam	
	Lunch Break (1 hour)	
	Faculty Meeting (Plenary Session) - in this meeting the following items are expected to be	
	discussed: (1) planning of subsequent academic activities, (2) ways of continuing this effort with	
	departments/institutions, (3) expansion of this effort to include research initiatives	
	Participants' Farewell Dinner (Venue: Traditional Tavern)	
August 1. 2011	Departure	

# **DISCLAIMER:**

The above schedule of events is subject to change at the discretion of the organizers and instructors of the course. While the order of lectures and events may differ from the aboveannounced, the general content of the course will not be altered in any significant way.



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Διά Βίου Μάθηση



# **Course Material**

On this web page you can find basic material pertaining to the course. Specifically, we will be adding items such as,

- **PowerPoint Presentations**
- Lecture Notes
- Readings
- Homework Assignments
- **Case Studies**

Further, a WebCT Course Web-site will be developed and maintained on Frederick University's server.

Log-on information will be provided in due time.



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# **Frederick University** (the Host Organization)

Frederick University is an energetic and vibrant private university operating in the Republic of Cyprus, a member state of the European Union. The University, enjoying respect and recognition both nationally and internationally, offers a broad range of academic programmes of study in the areas of Science, Engineering, Business, Tourism, Arts, Media and Education. The University has a strong focus on academic research, being one of the leading research organisations in the country.

With its dedication to academic excellence, provision of innovative and highquality programmes of study and active research, Frederick University is an ideal destination for young people interested in obtaining the knowledge, skills and free thinking needed to address the challenges of the modern world.

Frederick University operates from two campuses, one in Nicosia and another in Limassol.

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# **Main Contacts of Partner Universities**

University of Rome; Tor Vergata: Dr. Renato Baciocchi E-mail: <u>baciocchi@ing.uniroma2.it</u>

University of Seville: Dr. Luis Pérez Urrestarazu E-mail: <u>lperez@us.es</u> Algavre University: Dr. Fatima Farinha E-mail: <u>mfarinha@ualg.pt</u>

University of Malta: Mr. Kevin Gatt E-mail: kevin.gatt@um.edu.mt

Alexander T.E.I. of Thessaloniki: Dr. Demetris Konstantinides E-mail: <u>dkon@cie.teithe.gr</u>



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# **RELATED LINKS**

List links to pages within your Web site or links to other Web sites on the Internet. Explain how each page or site relates to your company or organization. To add more links, copy and paste additional text boxes. To increase your site's visibility on the Internet, ask other organizations to include a link to your site on their Web site.

#### Web site or page name 1

Select the Web site or page name above and link it to a Web address (URL). Describe the site and explain why the site is useful to your reader.

# Web site or page name 2

Select the Web site or page name above and link it to a Web address (URL). Describe the site and explain why the site is useful to your reader.

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# SUSTAINABLE CONSTRUCTION - PRINCIPLES, TOOLS AND METHODS **ERASMUS INTENSIVE PROGRAMME**





# **PHOTO GALLERY**

The following is a collection of photos from the SUSCON Intensive Program, which took place in Cyprus during July 2011.



Charalambos









# Date: July 2011

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