



EUROPEAN SUMMER SCHOOL ERASMUS INTENSE PROGRAMME (IP)

IN

**"Applied Informatics and Digital
Information Systems"
(*AI&DIS-CRETE*)**

Aim of the ERASMUS IP AI&DIS (1)

- ✓ The intensive education from experts in modern technologies of Telecommunication , Multimedia and Applications
- ✓ The development of a educational network with the cooperation of educational Institutions on issues education, common Project and research programs
- ✓ To enable students and teachers to work together in multinational groups and so benefit from special learning and teaching conditions not available in a single institution, additionally to gain new perspectives on the topic being studied.
- ✓ To provide something new in terms of learning opportunities, skills development, access to information, etc. for the participating teachers and students

Aim of the ERASMUS IP AI&DIS (2)

- ✓ To bring together students and staff from higher education institutions (HEI) and strengthen the mobility of professors and students.
- ✓ To allow members of teaching staff to exchange views on teaching content and new curricula approaches and test teaching methods in an international classroom environment
- ✓ The preparation of candidate students in a common Master Program titled "Telecommunication and Multimedia"
- ✓ To use the ECTS tools in Undergraduate and postgraduate Universities programs

PARTICIPATED UNIVERSITIES

ACADEMIC YEARS 2005-2006 & 2006-2007 Heraklion
(First two years)

1. Transilvania University of Brasov – Romania, Department of Electrical Engineering & Computers, Prof. Iuliu Szekely, Dan Nicula
2. FH-Vorarlberg University of Applied Sciences – Austria, Department of Informatics , Prof. Michael Kneidl
3. FH-Düsseldorf University of Applied Sciences – Germany, Departments : Medien & Elektrotechnik , Prof . Axel Schnell, Prof. Rogger Frese , Prof. Hans Günter Meier, Prof. Gehard Henning
4. Odense University of Southern Denmark– Denmark, Faculty of Engineering , Prof. Majgaard Cunver
5. TEI of Crete/Heraklion – Department of Applied informatics & Multimedia, 7 Professors

ACADEMIC YEAR 2007-2008 –Vitus Bering Denmark

1. Transilvania University of Brasov – Romania, Department of Electrical Engineering & Computers, Prof. Iuliu Szekely, Dan Nicula
2. FH-Vorarlberg University of Applied Sciences – Austria, Department of Informatik , Prof. Michael Kneidl
3. FH-Düsseldorf University of Applied Sciences – Germany, Departments : Medien & Electrotechnik , Prof Axel Schnell, Rogger Frese , Hans Günter Meier, Gehard Henning
4. Odense University of Southern Denmark Faculty of Engineering – Denmark, Prof. Majqaard Cunver
5. VIA University College – Denmark, Prof. Konstantin Lassithiotakis, Director of Studies
6. TEI of Crete/Heraklion – Department of Applied informatics & Multimedia, 6 Professors

Thematic modules (theory, laboratories and projects were developed in the program were:

- ✓ Data Acquisition-Data Logging Technologies
- ✓ Video/Audio Compression
- ✓ Digital Terrestrial Interactive Television-Digital Broadcasting Video
- ✓ Modulation schemes and base-band processing in digital broadcasting
- ✓ Real-time Communication and its quality in IP Networks
- ✓ Automatic speech recognition

- ✓ Computer Architecture and Digital Signal Processing
- ✓ Advanced Distributed Systems Programming and Advanced Multimedia
- ✓ Design of reconfigurable systems / embedded systems
- ✓ Advanced Multimedia
- ✓ Web design Technologies
- ✓ Information security
- ✓ Quality Management for engineering
- ✓ Software engineering – Electronic Villages

More information and experiences for the IP

- The attendance interest and follow-up in the program was very high for the following reasons:
 - the teaching subjects and
 - the region of the program implementation (Crete – Heraklion)
- The participated lectures are coming by personal contacts and acquaintances. TEI-Crete has a long term collaboration with the participating Universities
- The idea for the IP come as a result by the long term collaboration of TEI Crete and FH-D (Seminars, Winter schools, Common projects, Common research development programs, Joint Master Programm

Quality parameters of student mobility

The student selection made by both participating institutes

- Criteria of student selection:

The students selected among of last study semesters

- First prerequisite for the selection was to attend modules (in undergraduate studies) related of the IP thematic units.
The second was the good knowledge of English language.
- The program had 2 weeks duration, 70 hours theory plus project.
The equivalent EU credit were 7 ECTS.
- The successfully attended in the IP students took certification by the responsible University.

The participating students were come:

1. 18 by the collaborating universities
2. 25 by the TEI Crete.

Future Perspectives for the IP (1)

- ✓ Existed interest to renew the program for three more years in analogues context, titled “Telecommunication and Multimedia Technologies – TEMU”
- ✓ The results of evaluations and the experiences from precedents IP will contribute in the structure of new IP.
- ✓ The results give as more the opportunity for the enhance of the quality of the education programs and the ECTS tools.
- ✓ There is interest of two more educational institutes to participate in the new IP.

Future Perspectives for the IP (2)

- ✓ According to the new regulations by the Socrates- Erasmus Intensive Program the organization and finance support of the new IPs assigned by the National Award Agencies of each country.
- ✓ Three parts of the IP costs covered from the Greek National Award Agency (IKY):
 - Organization costs 100%
 - Travel Costs 75% (the rest 25% will be covered by the participating institutions)
 - Accommodation and daily costs 100%

**EUROPEAN SUMMER SCHOOL
INTENSE PROGRAMME**

 "Applied Informatics and Digital
Information Systems"

TIME TABLE JULY 2007

DATE	TIME	SUBJECT	PROFESSOR
Monday	09:30-10:00	Welcome Speech	A. Vlissidis (TEI-C) A. Schnell (FH-D) V.Zacharopoulos(TEI-C)
	10:00-11:30	Digital Terrest. Interactive Television	G.Mastorakis (TEI-C) Ch. Kokkinis (TEI-C)
	12:00-13:30 15.00 – 18.00	Applications of DVB in TEI Crete/Heraklion Visit in the Pasiphae Labor	G.Mastorakis (TEI-C) Ch. Kokkinis (TEI-C)
Tuesday	10:00-11:30	Electronic Villages	D.Akoymianakis (TEI-C)
	12:00-13:30 1500 – 18.00	Information Systems & Network Security Lab and Project	C. Manifavas (TEI-C)
	10:00-11:30 12:00-13:30 1500 – 18.00	Mod. Schemes & Base band proc. In DVB Lab and Project	A. Schnell (FH-D)
Thursday	12/07/07	10:00-11:30 12:00-13:30 15. – 18.00	Data Acquisition Data Logging Lab and Project A. Vlissidis (TEI-C)
Friday	13/07/07	10:00-11:30 12:00-13:30 15.00 – 18.00	Game Design Lab and Project Not Ionization Radiation M.Gunver (Uni Odense) Dimitris Stratakis (TEI-C)
Saturday	14/07/07		Visit to Knossos and Museum G. Owens (TEI-C)
Monday	16/07/07	10:00-11:30 12:00-13:30 15.00 – 18.00	Automatic Speech Recognition Lab and Project G. Meier (FH-D)
Tuesday	17/07/07	10:00-11:30 12:00-13:30 15.00 – 18.00	How to build a digital ASIC A/D and D/A conversion Techniques Lab and Project D. Nicula (UNI Brasov)
Wednesday	18/07/07	10:00-11:30 12:00-13:30 15'00-18.00	History of Crete Digital Signal Processing Preparation of project G.Owens (TEI-C) A.Schnell (FH-D) A. Vlissidis (TEI-C) A.Schnell (FH-D)
Thursday	19/07/07	10:00-11:30 12:00-13:30 15.00 – 18.00	Digital Radio Mondiale (DRM) An Introduction to Software engineering Lab and Project P. Vasseur (DRM-F) N. Vidakis (TEI-C)



Supported by Socrates Erasmus,
Intensive Program

Friday	20/07/07	10:00-11:30 12:00-13:30 15.00 – 18.00	Text-based information processing	A. Malamos (TEI-C)
Saturday	21/07/07	10:00-13.00	Projects presentation and Evaluation the program	Participated professors

9.30 Monday 09.07.07 Welcome on EN.PE.T Building / Registration

- 10:00-13:30** S.T.EF NEW Lecture Room 3 lecture hours, 15 min break between lessons
13:30-15:00 Lunch break
15:00-18:00 Department labs -> 3 hours for practice work (lab), lecture or workgroup session depending on lecturer, maybe two laboratory groups: 15:00-16:30 and 16:30-18:00 . Projects preparation.

Assoc .Prof. Dr .Eng. Andreas Vlissidis (TEI-C)
Prof. Dr. Axel Schnell (FH-D)

Heraklion 21.07.2007

CERTIFICATE

XXXXXXXXXX

Successfully attended the Intensive Program

European Summer School IP in
«Applied Informatics and Digital Information Systems»

that took place from 09/07/07 until 21/07/07 in the laboratories of the Department of Applied Information Systems and Multimedia, TEI of Crete in Heraklion, Hellas. The program was realised in collaboration with the FH-Düsseldorf - University of Applied Sciences in Germany, the University of Brasov in Romania, the Odense University College of Engineering in Denmark and the FH Vorarlberg - University of Applied Sciences in Austria.

It had a duration of 70 hours, theory and laboratory, with 7 ECTS maximum.

Head of Department

Prof. Vassilis Zaxaropoulos

Academic Directors of the Programme

Prof. Andreas Vlissidis

Prof. Axel Schnell

9) Digital Radio Mondial DRM)

Summary

Digital Radio Mondiale (DRM) is the universal, openly standardised, digital radio system for short-wave, medium-wave and long-wave - digital radio for the radio frequencies below 30MHz. It has been endorsed by the ITU, and is standardised as ETSI ES 201 980. DRM has near-FM sound quality plus the ease-of-use that comes from digital transmissions. DRM can be used for local services (Low power Medium Wave and/or local 26 MHz), regional services (high power medium wave), national services (high power Medium Wave and Long Wave and even Short Wave in large countries such as Brazil) and International services (High Power Short Wave)

10) How to build a digital ASIC

Summary

How to build a digital ASIC

From the design to the implementation

What is an ASIC

How to design a digital integrated circuit

How to implement a digital integrated circuit

Case Study: Design of a simple system

Conclusions

11) Electronic villages - Modern tendencies and advanced techniques of interaction in Community environments of use.

Summary

Will become a presentation of basic significances of "Community" interaction in simultaneously "virtual-Community" environments of use and will be given examples from work of research and technological growth.

12) Text based Information Processing

Summary

Text is still the most common and useful representation of knowledge. Text is used to express thoughts, ideas and generally human expressions and feelings. Thus text is language dependent, uses special symbols and the content expression is related to the writer. In this course we will refer to the history of computer text representation from ASCII to XML, the compression requirements of text as well as to information retrieval and content handling of electronic documents

13) Introduction to Software Engineering

Summary

The objectives of this lecture are:

To introduce software engineering and to explain its importance

To set out the answers to key questions about software engineering

What is software? What is software engineering? What is the difference between software engineering and computer science?

What is the difference between software engineering and system

engineering? What is a software process?

What is a software process model?

What are the costs of software engineering?

What are software engineering methods?

What is CASE (Computer-Aided Software Engineering)

What are the attributes of good software?

What are the key challenges facing software engineering?

To introduce ethical and professional issues and to explain why they are of concern to software engineers.

14) Information Systems & Network Security

The course objective is to introduce students to a number of technologies aiming to secure the computer and communications infrastructure. A variety of mechanisms and protocols designed to serve specific requirements (e.g. confidentiality, integrity, authentication, non-repudiation, etc) will be presented. For a technical approach to be viable and effective it has to comply with a set of social, business and legal constraints. Therefore, through out the course, examples of what has gone wrong and what the lessons have been for engineering a secure system will be highlighted. Students will have the opportunity to get hands on experience by submitting weekly exercises (using security s/w presented in the class, or security tools freely available) and by implementing a project which will have the form of a distributed security application (e.g., authentication infrastructure, e-payment / e-voting protocol, steganographic system).

MORE DETAILS

Course total hours: ~70h 7 ECTS points

The Courses will be held on the campus of the TEI by:

a) class contact mode

b) Workshops and demonstrations

c) Project work of participants

LECTURERS

Akoumianakis, D. (TEI)

Malamos, A. (TEI)

Maniavas X. (TEI)

Vasseur, P. (DR-FR)

Mastorakis, G. (TEI)

Vidakis, N. (TEI)

Vlissidis, A. (TEI)

Zacharopoulos, V. (TEI)

Cunver, M. (U. Odense)

Frese, R. (FH Düsseldorf)

Henning, G. (FH Düsseldorf)

Schnell, A. (FH Düsseldorf)

Meier, G. (FH Düsseldorf)

Nikula, D. (U. Brasov)

Skekely, I. (U. Brasov)

Kneidl, M. (FH Vorarlberg)

HOW TO REACH the TEI HERAKLION

By plane to Airport Nikos Kazantzakis Heraklion

From airport with busline nr. 1 to the TEI Heraklion.

CONTACT AND REGISTRATION

is available on email: esc@ep.teiher.gr



T.E.I.
OF CRETE

FH D
Fachhochschule
University of Applied Sciences



ODENSE
UNIVERSITY COLLEGE
OF ENGINEERING

Fachhochschule Vorarlberg
University of Applied Sciences



EUROPEAN SUMMER SCHOOL
INTENSE PROGRAMME

TITLE

"Applied Informatics and Digital
Information Systems"

Duration 9 July - 21 July 2007

Venue: T.E.I. Heraklion, Crete

Organizing Institutions:

TEI Crete/Heraklion, FH Düsseldorf

Coordinators:

Prof. Andreas Vlissidis, TEI Crete/Heraklion

Prof. Axel Schnell, FH Düsseldorf



Socrates

TARGET

This programme intends to provide an updated knowledge and skills on special aspects of digital information system technology.

Target groups:

- 1) Graduates and post-graduates to specialize on special areas of digital information technology
- 2) Professionals who require an updating and widening of their professional horizons and competitiveness

COURSE CONTENTS

1) Digital Terrestrial Interactive Television

Summary

The course of Digital Terrestrial Interactive Television covers the technologies that contribute towards the development and deployment of an infrastructure that makes use of the Terrestrial Digital Video Broadcasting (DVB-T) standard, capable to provide Digital TV programs' distribution along with Broadband Access to interactive Multimedia Services (i.e. Internet access, email, Video/Audio On Demand, off line TV, multicasts/datacasts, etc.). In this respect and after a short introduction to the basics of the DVB-T, the course analyses the fundamental transmission and reception principles (OFDM), besides emphasising on the multiplexing and encapsulation techniques (IP to MPEG-2) in both the IPv4 and IPv6 domain for efficient data transmission/reception. In turn, the course studies network architectures and system configurations that enable for Interactive services provision and broadband access to audiovisual applications, and analyses the operational status of the corresponding building blocks. Finally, the course concludes by focusing on the on-demand services' distribution making use of various access technologies in the reverse path (ISDN, GSM, GPRS, WLAN, xDSL, etc.), and elaborates on Bandwidth Management and Quality of Service (QoS) issues.

2) Modulation schemes and baseband processing in digital broadcasting

Summary

The technical background for digital broadcasting systems will be worked out. Transmission experiments with DVB-S and DVB-T systems will be performed. Parts of baseband-processing will be realised in VHDL for FPGA Synthesis.

The course will be held in a seminaristic manner. In addition to the lectures students have to prepare predefined themes with presentations and have to do practical experiments with DVB systems and FPGA synthesis.

3) Real-Time Communication and Quality of Service in IP Networks

Summary

For VoIP to be a realistic replacement for standard public switched

telephone network (PSTN) telephony services, customers need to receive the same quality of voice transmission they receive with basic telephone services - meaning consistently high-quality voice transmissions.

Like other real-time applications, VoIP is extremely bandwidth- and delay-sensitive. Whether a VoIP telephony system accomplishes the transmission of voice signals successfully is ultimately a subjective determination. That means, someone has to listen to the voice sent across the network and express an opinion as to whether it's of acceptable quality. The quality of a voice signal is affected by a number of characteristics, including:

- Absolute loudness. Is the volume high enough?
- Completeness. Are there gaps in the transmission?
- Loudness of the voice signal relative to background noise. Is it possible to hear the words above any hiss or other extraneous noise?
- Delay. Does it take too much time for the voice signal to get from the speaker's mouth to the listener's ear?
- Undesirable effects. Is there echo or other unwanted sound on the line?

4) Automatic Speech Recognition

Summary

Automatic speech recognition (ASR) addresses the problem of producing textual transcription of human speech utterances with a maximum of reliability by a computer. Because of the huge variability's in speech (caused by different speakers, changing voice characteristics and speed) combined with a large vocabulary (about 100.000 words) and changing acoustic input channels (different microphones, echo, back-ground noise) one has to cover a lot of different fields (speech pre-processing, feature extraction, statistical modeling of speech production and word usage, mathematical search algorithms to find the best word hypothesis) to build up a high performance ASR-system. To get a fundamental understanding of the whole, all this topics should be addressed in this course in a certain degree without going deeply into technical specialities. Nevertheless the students should have some basic understanding of DFT/FFT-analysis, stochastic signals, conditioned probabilities and probability densities.

5) Data Acquisition, Data Logging

Summary

Data acquisition (DAQ) is the process by which events in the real world are sampled and translated into machine-readable signals. DAQ, typically involves sensors, transmitters and other instruments to collect signals, waveforms etc. to be processed and analyzed with a computer. Data Loggers are data acquisition sensors, transmitters and other instruments used to collect real world signals and to translate them into machine-readable signals. Typical uses of data loggers include the measurement of temperature, humidity, light, signals, waveforms etc. to be recorded, processed and analyzed with computer software tools. Observation and measurement are central features of practical activity in science. The course of Data Acquisition and Data Logging, will cover the

subject of the collection of information, recording and ways of treatment. The program that will be used in DAQ and in the treatment of data will be MATLAB.

6) Video and Audio Compression

Summary

Video and Audio compression remains a subject of interest worldwide and an intensive area of application. The course will begin with an introduction to the compression algorithms theory. Furthermore, there will be discussed the application of compression algorithms into medias and the particular requirements raised by the media format and temporal requirements. Also, there will be discussed the application of wavelets into media compression and their contribution in quality and compression ratios improvement. Finally, the participants will exchange experience in video and audio compression applications development. The outline of the course is as follows:

- Classification of Compression Algorithms
- Entropy coding (LZW, RLE, Huffman Coding)
- Source Coding Techniques (FFT, DFT, Wavelet Transform)
- Image Compression/Decompression
- Video Compression/Decompression
- Audio Compression/Decompression
- Streaming Audio and video
- Java language and Media, the JMF framework
- Applications

7) Game Design

Summary

The focus will be on understanding and designing games. There will be 3 approaches:

- Analyses: The fundamental elements of game design such as structure of games, formal elements and dramatic elements are discussed
- Design method: A method for designing games will be introduced with the following keyword conceptualization, prototyping, play testing and balancing.
- Prototyping in practice in computer lab

8) A/D and D/A conversion techniques

Summary

The need for conversions in digital information systems
Main characteristics of the A/D and D/A conversions
Detailed operation of the basic type of DAC (R-2R ladder)
A survey of all types of DACs used today
Short classification of ADCs
Detailed operation of 2 types of ADCs
Improving the performance/complexity relation in ADCs
Improving the resolution of ADCs by DSP techniques

SUMMER 2006



SUMMER 2007



- Thank you very much for your attendance