Network application: CII-HU-0010-01-0607

Participating units

University of Vienna

University	University of Vienna
Street	Dr. Karl Lueger-Ring 1
Phone	+43 1 4277 - 0, +43 1 40400 (AKH)
Zip / city	1010 Wien
Country	Austria
Homepage	www.univie.ac.at

Institution	Institute for Analytical Chemistry
Street	Waehringerstr. 38
Zip / city	1090 Vienna
Country	Austria
Homepage	www.anc.univie.ac.at/

Contact:

Prof. Dr. Ernst Kenndler
ernst.kenndler@univie.ac.at

University of Graz

University	University of Graz
Street	Universitätsplatz 3
Phone	+43 316 380-0,
Zip / city	8010 Graz
Country	Austria
Homepage	www.kfunigraz.ac.at

Institution	Institute of Pharmaceutical Sciences/Department of Pharmaceutical Chemistry
Street	Universitätsplatz 1
Zip / city	8010 Graz
Country	Austria
Homepage	www.uni-graz.at/ipcwww

Contact:

Associate Professor Dr., Mag. Gerald Gübitz
guebitz@uni-graz.at

Graz University of Technology

University	Graz University of Technology
Street	Rechbauerstrasse 12
Phone	, +43 316 873-0
Zip / city	8010 Graz
Country	Austria
Homepage	www.tugraz.at

Institution	Institute for Analytical Chemistry and Radiochemistry
Street	Technikerstrasse 4
Zip / city	8010 Graz
Country	Austria
Homepage	fmysql.tu-graz.ac.at/~acmr/en/

Contact:

Professor Prof. Dr. Ernst Lankmayr
lankmayr@tugraz.at

Neophit Rilski South-West University

University	Neophit Rilski South-West University	Institution	Faculty of Natural Sciences, Department of Chemistry
Street		Street	66, Ivan Mihailov, str.
Phone	,	Zip / city	2700 Blagoevgrad
Zip / city		Country	Bulgaria
Country	Bulgaria	Homepage	www.swu.bg
Homepage			

Contact:

Head of Laboratory Assoc. Prof. Tamara Pajpanova
tamara@obzor.bio21.bas.bg

Sofia University St.Kliment Ohridski

University	Sofia University St.Kliment Ohridski	Institution	Faculty of Philosophy
Street		Street	15 Tzar Osvoboditel Blvd
Phone	,	Zip / city	1504 Sofia
Zip / city		Country	Bulgaria
Country	Bulgaria	Homepage	www.uni-sofia.bg
Homepage			

Contact:

head of the laboratory of radioanalytical chemistry professor IVELIN KULEFF
kuleff@chem.uni-sofia.bg

University of Zagreb

University	University of Zagreb	Institution	Faculty of Science
Street	Trg marsala Tita 14	Street	Horvatovac 102A
Phone	, +385 1 4564 233	Zip / city	10000 Zagreb
Zip / city	10000 Zagreb	Country	Croatia
Country	Croatia	Homepage	www.pmf.hr/
Homepage	www.unizg.hr		

Contact:

Head of Laboratory Prof. Dubravka Matkovic-Calogovic
dubravka@chem.pmf.hr

Charles University in Prague

University	Charles University in Prague	Institution	Charles University in Prague, Faculty of Science
Street	Ovocný trh 3	Street	Albertov 2030
Phone	, +420 224 491 302	Zip / city	128 40 Prague 2
Zip / city	116 36 Praha 1	Country	Czech Republic
Country	Czech Republic	Homepage	www.natur.cuni.cz/english_version/index.php
Homepage	www.cuni.cz		

Contact:

Vice Dean Assoc. Prof. Bohuslav Gas
gas@natur.cuni.cz

University of Pécs

University	University of Pécs
Street	Szántó K. János u. 1/B.
Phone	, +36-72-501-500
Zip / city	7601 Pécs
Country	Hungary
Homepage	www.pte.hu

Institution	Department of Analytical Chemistry, Fac. of Sciences and Institute of Bioanalysis, Fac. of Medicine
Street	Ifjúság útja 6.
Zip / city	7624 Pécs
Country	Hungary
Homepage	www.aok.pte.hu/bioanal/indexen.html

Contact:

Head of Department Prof. Ferenc Kilár
ferenc.kilar@aok.pte.hu

Eötvös Loránd University

University	Eötvös Loránd University
Street	Egyetem tér 1-3.
Phone	, +36-1-267-0820
Zip / city	1053 Budapest
Country	Hungary
Homepage	www.elte.hu

Institution	Institute of Chemistry
Street	Pázmány sétány 1/A
Zip / city	1117 Budapest
Country	Hungary
Homepage	teo.elte.hu/fs/chembase.html

Contact:

Associate Professor Prof. Gábor Dibó
dibo@chem.elte.hu

University of Debrecen

University	University of Debrecen
Street	Egyetem tér 1.
Phone	, +36-52-512-900
Zip / city	4010 Debrecen
Country	Hungary
Homepage	www.unideb.hu

Institution	Department of Inorganic and Analytical Chemistry
Street	Egyetem tér 1.
Zip / city	4010 Debrecen
Country	Hungary
Homepage	http://www.klte.hu/~wwwinorg/inorg.html

Contact:

ass. prof. Dr. Attila Gáspár
gaspara@tigris.klte.hu

SS.Cyril and Methodius University in Skopje

University	SS.Cyril and Methodius University in Skopje
Street	Bul "Krste Petkov Misirkov" BB
Phone	+389 23293293,
Zip / city	1000 Skopje
Country	Macedonia, The Former Yugoslav Republic of
Homepage	www.ukim.edu.mk

Institution	Faculty of Natural Sciences and Mathematics
Street	Gazi Baba b.b.
Zip / city	1000 Skopje
Country	Macedonia, The Former Yugoslav Republic of
Homepage	

Contact:

Professor Dr. Trajce Stafilov
trajcest@iunona.pmf.ukim.edu.mk

Warsaw University

University	Warsaw University	Institution	Department of Chemistry
Street	ul. Krakowskie Przedmiescie 26/28	Street	Pasteura 1
Phone	, +48 225520000	Zip / city	02-093 Warsaw
Zip / city	927 Warszawa	Country	Poland
Country	Poland	Homepage	alfa.chem.uw.edu.pl/index_en.htm
Homepage	www.uw.edu.pl		

Contact:

Head of Laboratory Prof. dr Marek Trojanowicz
trojan@chem.uw.edu.pl

“BABES BOLYAI” UNIVERSITY OF CLUJ-NAPOCA

University	“BABES BOLYAI” UNIVERSITY OF CLUJ-NAPOCA	Institution	Department of Biochemistry and Biochemical Engineering
Street	1, Mihail Kogalniceanu Street	Street	Arany Janos st. nr. 11
Phone	, +40264 405 300	Zip / city	400028 Cluj - Napoca
Zip / city	400084 Cluj-Napoca, Cluj county	Country	Romania
Country	Romania	Homepage	www.chem.ubbcluj.ro/engleza/index_en.html
Homepage	www.ubbcluj.ro		

Contact:

Head of Dept. Professor Dr. Florin Dan IRIMIE
irimie@chem.ubbcluj.ro

UNIVERSITY OF MEDICINE AND PHARMACY OF TÂRGU MURES

University	UNIVERSITY OF MEDICINE AND PHARMACY OF TÂRGU MURES	Institution	Department of Bioanalysis
Street	38, Gh. Marinescu	Street	Gh.Marinescu nr.38
Phone	, +40265 215551	Zip / city	540139 Targu Mures
Zip / city	540000 Târgu Mures, Mures county	Country	Romania
Country	Romania	Homepage	www.umftgm.ro/index.html
Homepage	www.umftgm.ro		

Contact:

Head of Department Prof. Dr. Bela Tokes
btokes@umftgm.ro

Comenius University in Bratislava

University	Comenius University in Bratislava	Institution	Department of Analytical Chemistry, Faculty of Natural Sciences,Comenius University in Bratislava
Street	Šafárikovo nám. 6		
Phone	+421-2-59244 141, +421-2- 5292 1594	Street	Mlynska Dolina CH-2
Zip / city	81806 Bratislava 16	Zip / city	84215 Bratislava
Country	Slovakia	Country	Slovakia
Homepage	www.uniba.sk	Homepage	www.analytika.sk

Contact:

Teacher Prof. Dusan Kaniansky
kaniansky@fns.uniba.sk

Constantine The Philosopher University in Nitra

University	Constantine The Philosopher University in Nitra	Institution	Faculty of Natural Sciences
Street	Trieda A. Hlinku 1	Street	Tr. A. Hlinku 1
Phone	+421-37-6511 253, +421-37-6511 330	Zip / city	949 74 Nitra
Zip / city	949 01 Nitra	Country	Slovakia
Country	Slovakia	Homepage	www.ukf.sk
Homepage	www.ukf.sk		

Contact:

Teacher RNDr, PhD. Klaudia Jomová

kjomova@ukf.sk

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Long program description

BACKGROUND
<>
<>Chemistry in general
becomes one of the most important areas in natural science. Although, the knowledge of the whole chemistry is necessary for successful research and application, it is important to define sub-areas that have very high importance, too. One of those important areas analytical chemistry can be considered the broadest, since it is used in every subtopics, and, *vice versa*, it needs the knowledge of every other chemistry areas, such as, physical chemistry, inorganic and organic chemistry, environmental chemistry and biochemistry. Our Network chose, therefore, one of the broadest areas, bioanalytical chemistry, although, through this area we found that chemistry can – and should – be handled. The methods of bioanalysis are of great importance in most of the areas of everyday life, because the techniques are applied in food industry, environment, healthcare, drug industry, quality control, etc.

The Network was built
by several internationally recognized institutes that have been involved in the development and application of modern analytical chemical and clinical chemical methods in Central and Eastern Europe. During the past eight “CEEPUS-years”, the institutes in this network have built a strong and effective background for common work within Teaching and Learning Bioanalysis.

AIMS
OF THE NETWORK
The network includes
Universities from almost all CEEPUS countries providing a very nice framework. The Departments represent various aspects of analytical, bioanalytical, biochemical and clinical chemistry, etc., but all are responsible for the education of different aspects in bioanalysis. All have a common interest in research that is the application and development of modern separation techniques, e.g. HPLC, capillary electrophoresis, physical chemical analysis, biotransformation and other instrumental bioanalytical methods. These conditions provide excellent background to combine the teaching resources and to assemble and develop a common educational scheme in bioanalysis and analytical chemistry. Special scientific interests of the different institutes and the special conditions of the Universities give a very good supplement for the network participants. The main aim is to share and divide the knowledge and experiences in the different fields for both, educational and research purposes.
<>During the above
mentioned eight CEEPUS years we found, however, that the frame of CEEPUS can be applied in an excellent way for education in collaborative, common platform, therefore, we have formed “Joint Projects” already several years before it was implemented in the “Ceepus life”. We have developed our co-tutelle system for supervising students and having diplomas prepared commonly in two Universities, as well as PhD degrees were received and recognized by the collaborating doctoral schools. Although, the legal background is still missing in Europe, we could show that this frame improved our possibilities, the students were gaining a great benefit of such a close and joint collaborative work.
Therefore, we have started to make our Network a use of this collaboration, and tried to formulate common curricula in analytical chemistry, and through this in chemistry.

The partners of this
Network are internationally recognized laboratories and institutes. The main researchers have published more than 2000 papers within the last 10 years that gives a very deep scientific background of the educational purposes in

Bioanalysis.

<>PROPOSED ACTIVITIES

Since 2004 we are
applying the credit systems in the recognition of both, lectures given by the teachers and courses taken by the undergraduate and PhD students. Since mostly MSc diploma students are traveling within the Network, we consider that the use of the ECTS points is important for a common recognition of the study trips.

In our Network we use
the following calculation.

1 credit = ca. 8-15
contact hours + ca. 15-20 hours home work for understanding and literature searching, etc.

Therefore, in this
application we give the lists of the courses at the different Universities that will be offered for the students indicating the credits. See the list in the Appendix of this Long Description.

Every possibilities
that are covered by the CEEPUS project have been and will be utilized for educational and research purposes, in order to deepen, strengthen and intensify the contacts between the Universities in Central and Eastern Europe, according to the general rules and recommendation. The projects are now mainly continued in the form of joint activities, although, the legal background is not yet available at a governmental level.

The participation of
students in the education and research at a foreign University is the main purpose of this network. The special Summer Schools have been and will be organized to give opportunity for students at the hosting University and also participants from this network to participate in extensive theoretical and practical courses. This form served as the most useful form to exchange the special knowledge of the different laboratories. During the years from 1998 till 2005 all participant Universities performed an extensive mobility exchange. At least once, a year coordination meetings were held and will be held in the future, too.

For PhD students the
Institutes announce different special research topics and also PhD courses that have already resulted in joint projects, degrees, common scientific publications and contributed to the success of the PhD studies.

Since we have had a
long and real activity in the Joint Program format, we now implement our contribution to the European education and research area. A joint grade will be given to thos who are participating in the Ceepus program

between the University of Medicine and Pharmacy and University of Pécs (see the format at the respective session). Another concrete activity is the co-tutelle of several PhD students in a more advanced and administratively registered format.

EXPECTED
RESULTS

After the acceptance of the Bologna agreement we accommodate our activities to fit in this European system. Lecture notes, common courses, summer courses and other activities have been organized and characterized by commonly used credits. PhD students are continuously sent and accepted at every University to continue short research practice for their studies. The purposes of such visits are twofold, 1. to perform studies of common interest, 2. to learn new techniques at the hosting institutes, that have special experiences in different scientific areas.

Another result was that we could initiate a broader network formation within the Marie Curie program of European Union together with Universities from other EU countries.

The H-76 network started in 1998 and it is not a closed system. It is open for other Universities as further extension has been proposed several times in the past. During the last year 15 universities were included in the Network.

SHORT DESCRIPTION OF
THE RESEARCH AND OTHER ACTIVITIES AT THE PARTICIPATING DEPARTMENTS

A1

In the Institute of Analytical Chemistry at Vienna University analytical separation and detection methods are further developed and applied to practical problems in biochemistry, pharmaceutical chemistry, environmental and food chemistry, and in archaeometry of organic matter. Separation methods are gas and liquid chromatography, detection methods are UV-VIS and fluorescence spectrometry; besides the usual detectors for GC, mass spectrometry is used, too. One of the special working areas of this partner includes the computer simulation of the capillary electrophoretic process and the implementation of chemometric methods into analytical methods. The main topics for special interest in chemical education: (i) in cooperation with TU Eindhoven (NL) a simulation program was developed, that is highly useful for educational and training purposes, especially for undergraduate and graduate students; (ii) application of a theory that enables to describe the adsorption process and to

forecast the shape of the electrophoretic peak as a result of adsorption; (iii) dissemination of the theoretical approach of electromigration in the education; (iv) fluorescence studies of macoassemblies, such as viruses and the follow up the entry of viruses and virus components into cells.

A2

The educational task
of the Laboratory of Drug Analysis at the Institute of Pharmaceutical Chemistry is teaching of Analytical Chemistry for pharmacy students. The research activities of Professor Gerald Gübitz involve drug analysis including capillary electrophoresis techniques such as capillary zone electrophoresis (CZE), micellar electrokinetic chromatography (MEKC) and capillary electrochromatography (CEC). A special topic is the chiral separation of drugs by CE. Chiral separation gained much interest in recent years, since it is known that the enantiomers of compounds of biological and pharmaceutical interest can display different biological and pharmacological activities. In some cases even toxic effects were observed with the unwanted enantiomer. The main goal of the group of G. Gübitz is to develop new methods for chiral separations using CZE, MEKC and CEC. CEC is a recent technique, whereby packed capillaries with chiral phases or wall coated capillaries containing the chiral selector are used. This project includes the synthesis of new chiral selectors for CZE and chiral phases for CEC and the application to the chiral resolution of compounds of biological and pharmaceutical interest. In this work advanced students such as diplomands and PhD-students could be involved.

BG1

The South-western University is a
center of a rich educational and scientific activity, one of the most authoritative spiritual fireplaces outside the capital. There are 10 500 Bulgarian and foreign students at the University. The Faculty of Natural Sciences and Mathematics was founded in 1989 by a decree of the Council of Ministers. It was organized to pursue higher education and research in different fields of natural science. The Faculty of Natural Sciences and Mathematics currently offers Bachelor, Master and PhD degree programmes, as well as specialized courses for further education. It also offers a programme to obtain a qualification as a Secondary School Teachers of natural science disciplines.

The
Department of Chemistry at the South-West University is giving courses in the following levels of university education: B.Sc. in Chemistry, M.Sc. in Bioorganic Chemistry, Ph.D. programs in Bioorganic Chemistry, Biochemistry and Molecular Biology. The main education task of this department includes the teaching of organic chemistry, inorganic chemistry, physical chemistry and analytical chemistry (in general; instrumental methods - mass and infrared spectroscopy, atomic spectroscopy, NMR, HPLC; separation methods). The main research topics include: physical chemistry - applied electrochemistry, solution structure and thermodynamics; organic chemistry - new synthetic methods, mechanisms of reactions; bioorganic chemistry - rational design of chemotherapeutic agents; environmental and analytical chemistry - analytical methods of detection and determination of pollutants, separation methods in environment protection.

The
Department of Chemistry and the Laboratory of Research and Applied Bioorganic Chemistry are working together in this Network. The Laboratory was established in Blagoevgrad in 1986 as a division of the Institute of Molecular Biology, Bulgarian Academy of Sciences The activities of the Laboratory include synthesis,analysis and pharmacological investigations of bioactive peptides – search for stable and potent agonists and antagonists of opioid receptors, development of selective procedures for industrial and small scale synthesis of peptides. Another major area of interest is the development of conformationally restricted unnatural amino acids and dipeptidemimetics for the preparation of novel molecular architectures. Among the special research activities, the staff members of the Laboratory take part in the teaching at the undergraduate (resulting in M.Sc.) and postgraduate (resulting in Ph.D.) level for students in the field of bioorganic chemistry, biochemistry and molecular biology.

BG2

Further information

The Network has a web-site:
http://www.pote.hu/bioanal/ceepus/ceepus.html

This Network has had a succesful history of research and education since 1998. The participants had strong benefit of the study trips of both students and teachers. The Network was awarded the Ministers Prize of CEEPUS in 2003.

The Network uses the ECTS credit system. However, it has two different levels, due to the fact that the Universities have not standardized the subject-names and also the titles of the different “lines” (in whole Europe). These results in that the files and the web-pages containing the ECTS data are not in the same form, and not even in the same language, in general. In our application we provide all the web pages, where the relevant lines/schedules are given and accomodated to the ECTS system. The languages of these web-pages are different, and very rarely in English. In some cases we uploaded special files that contain the most relevant information on the ECTS credits in Chemistry, Biochemistry, Pharmaceutical Chemistry.
In our Network we apply those credits that are indicated on these web pages, but also we developed a credit list for those courses and lectures, which are accepted by our Universities as elective or facultative courses/lectures.

Planed activities

The main tasks of the mobility exchanges of students and teachers between the partner institutions will aim: 1. Learning special techniques that are not available at the home institutions, 2. Performing scientific research experiments for the PhD thesis works, 3. Teaching the techniques at the host institutions, 4. Organizing Summer Schools in different fields of Bioanalysis. Both, student and teacher mobility actions are planned from and to each member of the network.
Teacher and student mobility actions are planned for educational purposes in analytical chemistry, while special student mobility actions (contribution to PhD studies) will also be organized in special topics of the different institutes working in the field of bioanalysis.

The joint programs that are planned now have been continued previously, although, it was not requested by the CEEPUS program. The new implementation of joint programs is now makes our previous work more concrete and gives an official frame for that.

Although, a precise statistics is naot available, we count that more than 10 PhD degrees, ca 15 common diploma work, and ca 20 articles were prepared within the 8 years of Ceepus H-76.

Successful Summer Schools have been organized in Bratislava – 1999 (capillary electrophoresis), Pécs – 2000 (HPLC and separation methods in chiral analysis), Warsaw – 2002 (instrumental bioanalysis), in Cluj – 2003 (biotransformation) and in Sofia – June 2004 (analytical and bioanalytical monitoring methods), Prague – May 2005 (theoretical background of bioanalytical methods). Altogether ca. 250-300 trips were completed in relation to the Summer Schools until now.
The Summer School planned for 2007 will be organized in Pécs again. Since in the new formula of the application it is not possible to put the need for the support for Summer School, therefore, the incoming and outgoing activities are not including the planned Summer School activities.
The topic of the Summer School, planned in Pécs will include "Mass spectrometry and micro electromigration techniques in bioanalysis".
The activity of the Network has been discussed regularly in Coordination Meetings, once or two times each year. The last Meeting has been held in Prague. The next coordination meeting is planned to be held in Budapest.

Types of instructions planed

courses
assistance with work on a (doctoral) thesis
laboratory work
lectures
summerschool
others (pls. specify in section 'network aktivities')

Language of instructions planed

english
others (pls. specify in section 'network aktivities')