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REFORMING THE STUDY PROGRAMS AND CURRICULA AT THE UNIVERSITY OF SPLIT FROM THE PERSPECTIVE OF THE PROVISIONS OF THE BOLOGNA DECLARATION

A Case Study (February 2003)

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I. Introduction

The University of Split, in its capacity as a pilot institution in the UNESCO-CEPES 'Regional University Network on Governance and Management of Higher Education' programme, was requested to develop a case study on the topic of: "*Reforming the study programmes and curricula in South East Europe Universities from the perspectives of the provisions of the Bologna Declaration*". Croatia signed the Lisbon Convention back in 1997, and the Bologna Declaration in 2001. With its signature Croatia made a commitment to introduce a wide range of Higher Education-level reforms in line with the provisions of the Declaration.

The purpose of this case study is to provide an update on the progress made by the University of Split with regards the introduction of measures set out in the Declaration – which it should be noted from the start, is very much in its early stages. Specific focus will be given to some of the key elements of the Bologna process such as: the reform of degree structure and curricula, the introduction of credit systems, the recognition of degrees, the promotion of mobility, quality assurance and accreditation. The paper will also set the wider reform context in Croatia in light of a proposed draft 'Scientific Research and Higher Education Law' which is currently at the committee stage in the Croatian parliament, and which incorporates many of the provisions of the Bologna Declaration. The study will give examples of current and proposed structures and practices at both the national level as well as at the University of Split. Also examined, as requested in the study guidelines, will be the structure and organisation of a number of undergraduate and post-graduate degree programmes run by the University of Split, with a special focus on "Joint Degrees". The study's concluding section will look at the University of Split's internal Strengths and Weaknesses, as well as the external Opportunities and Threats (SWOT Analysis), in relation to it's current ability to reform the its organisational, administrative and degree course structures as well as its curricula.

II. Reform of the Higher Education System in Croatia

1. The Draft Law on Scientific Research and Higher Education

The Higher education system in Croatia has not significantly changed in many decades. A new Law on Scientific Research and Higher Education, which incorporates the provisions of the Bologna Declaration, is still in the debate phase within a number of parliamentary working groups, and it is expected to "enter" the Parliamentary procedure this spring. This September the new Minister of Science and Technology, Mr. Gvozden Flego arrived in office, and amended the draft version of the proposed Scientific Research and Higher Education law. This legislation will bring changes across the whole of the Higher Education system. The some of the main changes proposed in the legislation are as follows:

- The reduction of the independence (financial & administrative) of faculties towards their universities
- The introduction of the European model of structure and duration of university courses (3+2+3)
- Greater vertical and horizontal mobility for students and professors
- Left an option for changes in enrolment procedures at undergraduate level

Two important elements of the reform which are considered the a priority by the University of Split are:

- The introduction of the "Diploma Supplement"
- The introduction of the ECTS (European Credit Transfer System)

The new version of the proposed law has not yet been translated but the version in Croatian is available from:
http://www.mzt.hr/mzt/hrv/djelatnosti/visoko/novi_zvu2002/nacrt.052%20konacno.pdf
for the previous draft please see:
http://www.mzt.hr/mzt/eng/activities/highedu/draft_bihe.htm

It is important to note that the independence of faculties towards their university will still remain quite strong under the proposed legislation. This is mainly because there was a great deal of opposition to initial proposals made by the former Minister of Science and technology, who wanted to see a far greater reduction in the financial, strategic and administrative independence of Croatian faculties.

A further proposed change, which this author considers important, relates to student choice of optional courses as part of their main degree. Currently it is not possible for a student to choose a optional course which is not taught at their chosen faculty. It is being proposed that up to 30% of a student's degree can be chosen from any university member faculty (aside from their own). This will mean that students will receive a University diploma rather than one issued by their faculty as is currently the case.

The new legislation, if passed, will introduce the ECTS and the "Diploma Supplement". It is anticipated that this change will bring lot difficulties to university staff. Professors may find it difficult to shift from the current system of organizing and marking their course modules due to the complexity of the ECTS system. Some professors at the University of Split have raised their concerns regarding such a fundamental and wide-reaching change in the approach to managing their courses.

The present Minister, Dr Flego, has stated that he is hoping that the new law will be applicable from the beginning of the next academic year (1st of October 2003).

2. Proposed Changes in Enrolment Procedures

A key area of reform proposed within the above-mentioned draft law, relates to the change in enrolment policies across the Higher Education System. Up to now, students would enrol in the first year of their studies at the age of 18, having to pass an entrance exam at their faculty of choice. Each faculty has their own enrolment test (depending on the area). The student applying for entry to a particular faculty is assessed according to their High School marks and their success on the enrolment test. The proposed new procedures for entering university level education are based on a "State Graduation Diploma" which they would receive once they have finished High School and passed a new General State Exam.
Entry to the university would depend on the results of the General State Exam and on the number of places available at their chosen faculty.
It is considered that this system will be fairer than the one that is now in place, given that the complexity and difficulty of High School courses across the country vary markedly.

The centralised General State Exam was originally to be introduced by 2004, however the new Minister of Science and Technology recently stated that there would be a delay of around one year later.

III. The University of Split

The University of Split was officially established on June 15, 1974 by merging a number of formerly independent Faculties which were affiliated to the University of Zagreb. The University tradition in this area dates back to 1396 when the Dominicans established the General University (Jadertina Universities) in Zadar. This University included the College of Philosophy and Theology in Zadar. Master's and Doctoral programmes from that University were recognized as being equal to those of the major European universities of that time. In 1807, the General University was forced to close by the French revolutionary authorities. The first faculty of Medicine on the eastern Adriatic coast was established in 1806 in Trogir, a small medieval town near Split. This school taught the fundamentals of medicine, surgery, obstetrics and theoretical chemistry.(University of Split publication, 1999)

Today, each of the **four** Croatian Universities: Zagreb, Osijek, Rijeka and Split, offer different courses, which have developed in relation to their geographical position, and to their regional and industrial development. The University of Split, because of its Adriatic costal position, has a strong faculty of: Electrical Engineering, Mechanical Engineering and Naval Architecture (Split used to be a strong centre for the ship building industry), Sea and Maritime studies department, College of Naval studies and Institute of Oceanography and Fishery.

In addition to this, the University of Split has the following faculties, departments and institutes:

- Faculty of Natural Sciences, Mathematics and Education;
- Faculty for Chemical Technology;
- Faculty of Law;
- Faculty of Economics;
- Faculty of Civil Engineering;
- Faculty of Medicine;
- Catholic Faculty of Theology;
- Academy of Arts;
- University Department of Humanities;
- College of Education;
- Institute for Adriatic Crops and Karsts Reclamation (this is an independent scientific institution associated with the University of Split);
- and in Dubrovnik there is the Faculty of Tourism and Foreign Trade.

Currently around **16 000 students** are studying in Split. This is out of a total university student population in Croatia of around 100,000.

For some time now, there are plans to open a Faculty of Architecture and a University Department of Sociology.

In September 2002 the University of Zadar separated from the University of Split, which has resulted in Split losing its Faculty of Philosophy, which runs courses in eight foreign languages, Pedagogy, Psychology, History, Philosophy, Sociology, History of Art, Archaeology, Culture and Tourism, and Geography.

The University of Split is in the process of building a **University Campus** where all the University member institutions will be located on a "department basis". A new University Library will be built on the campus, together with a student halls of residence and sport facilities. The Campus will open up new employment opportunities, especially for young scientists. Split, therefore has a great opportunity to become a first-class University town by 2007.

IV. The State of curricula in view of the provisions of the Bologna Declaration – with Specific Reference to the University of Split

1. Bologna Declaration and Envisaged Developments at the University

The Bologna Declaration is a pledge by 29 countries to reform the structures of their higher education systems in a convergent way. All of the 29 countries who signed the Declaration, made a commitment to create a European space for higher education by 2010. Among other specified objectives Croatia's priorities are:

- adoption of a common framework of readable and comparable degrees through the implementation of the Diploma Supplement;
- introduction of undergraduate and postgraduate levels in all countries, with first degrees no shorter than 3 years and relevant to the labour market;
- ECTS compatible credit system (CRE 2000)

In order to start working towards achieving these reform goals, the University of Split is in the process of forming a Board for International Relations and ECTS. We plan to appoint an ECTS coordinator for the University who will coordinate help to develop, design and coordinate the ECTS systems across all of the faculties. Each faculty will identify a team of people who will work on re-structuring the relevant degree courses and their curricula, and help introduce ECTS and the Diploma Supplement. They will report to the ECTS coordinator. The timeframe that the University has set for implementing the ECTS at the Doctoral level is 2004-2005, and 2005-2006 for undergraduate and Master programmes.

2. Curricula Change

2.1 The process of developing and changing curricula in Croatia

Curricula change is a central theme of the Bologna Declaration relating to areas such as comparable degrees and ECTS, and it is an issue which the Croatian Higher Education system will need to address in the coming years. The following section outlines the process for developing and introducing new curricula in Croatia.

The National Council for Higher Education in Croatia approves all of the curricula changes at Croatian universities. The Council was formed by the Croatian Parliament in April 2001. It is made up of twelve members and a president. Their role is to advise and give recommendations and suggestions to the Minister of Science and Technology.

The role of the council is to measure and gauge the quality of higher education institutions and to approve new curricula. It also plays a major role in influencing the whole politics and direction in the area of the higher education.

The process of introducing new curricula in Croatian universities is one of the key tasks of the council. This is done through curricula reform committees which are elected by the Minister of Science and Technology, following the recommendation given by the Council members. The committee will make its decision about the new curricula, taking into account the opinions of academic experts, the self-assessment of the institution, internationally recognized experts and professional societies. When the committees make their final report, the Minister of Science and Technology forwards it to the council, which will than give its final recommendation. The minister will then decide whether to issue the accreditation for the new curricula. In the case that accreditation is denied, institutions will receive a "Letter of Expectation" stating what should be improved or changed and by what date the council expects this changes to happen.

2.2 Curricula Change and the proposed law on Scientific Research and Higher Education

The draft of the new law on Scientific Research and Higher Education states that, in time, all university curricula must:

- be based on the latest scientific research and skills;
- relate to national priorities and the needs of the professional sector;
- be in line with corresponding curricula in the European Union higher education institutions.

These three conditions have been proposed in line with the provisions of the Bologna Declaration.

2.3 Curricula Change at the University of Split

Changes in curricula at the faculties of the University of Split happen approximately every five years as recommended by law. Some faculties can introduce this change more often but any change must receive the approval of the Minister of Science and Technology, as explained above.

With the proposed introduction of the ECTS all new curricula will have to conform to European standards, and all the current ones will need to be amended. This could prove problematic as some faculties at the University of Split have so far been reluctant to modify or introduce new curricula. This is especially the case in faculties where a large number of staff are senior.

Finally, it is important to note that The University of Split has not, to date, elaborated a policy document relating to the reform of its study programmes and curricula. However, the soon to be established Board of International Relation and ECTS (see above) will make this a priority task.

3. Degree Structure

3.1 Degree Duration at The University of Split

The table below gives an outline of the duration of courses at the University of Split in each faculty.

There is a difference between Scientific and Professional degree courses at the University of Split. Scientific degrees usually last four years whilst professional ones last two. Students who complete a scientific undergraduate degree can apply for scientific Masters programmes (duration two years), and students who finish a professional degree can apply for a professional Masters course (duration - one year).

UNIVERSITY OF SPLIT MEMBER INSTITUTIONS	2 years Diploma	2,1/2 years Diploma	3 years Diploma	4 years Diploma B.A.	4,1/2 years Diploma B.A.	5 years Diploma B.A.	6 years Diploma B.A.	Prof. Master Degree M.A.	Sci. Master Degree M.A.	Doctor Degree Ph.D.
NATURAL SCIENCES										
Faculty of Natural Sciences, Mathematics and Education				X				X		
University Department of Sea and Maritime Studies				X						
TECHNICAL SCIENCES										
Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture	X	X			X			X		X
Faculty of Civil Engineering		X		X				X		X

UNIVERSITY OF SPLIT MEMBER INSTITUTIONS	2 years Diploma	2,1/2 years Diploma	3 years Diploma	4 years Diploma B.A.	4,1/2 years Diploma B.A.	5 years Diploma B.A.	6 years Diploma B.A.	Prof. Master Degree M.A.	Sci. Master Degree M.A.	Doctor Degree Ph.D.
Faculty of Chemical-Technology		X			X			X		X
College of Maritime Studies	X			X						
BIOMEDICAL SCIENCES										
Faculty of Medicine							X	X		X
SOCIAL SCIENCES										
Faculty of Economics	X			X				X	X	
Faculty of Law	X			X					X	
Faculty of Tourism and				X						

UNIVERSITY OF SPLIT MEMBER INSTITUTIONS	2 years Diploma	2,1/2 years Diploma	3 years Diploma	4 years Diploma B.A.	4,1/2 years Diploma B.A.	5 years Diploma B.A.	6 years Diploma B.A.	Prof. Master Degree M.A.	Sci. Master Degree M.A.	Doctor Degree Ph.D.
Foreign Trade										
College of Education	X			X						
HUMANITIES										
University Department of Humanities				X						
Catholic Faculty of Theology				X		X				
ART										
Academy of Arts			X	X						

3.2 Degree Structure - Undergraduate

3.3 Background – Undergraduate Completion rate

"A student" in Croatia is not only an educational category, but also a social category. Because of the high unemployment rate (22% in 2001) many young people choose to continue their education at a higher education institution, in order to delay the problem of finding a job. This is one of the main reasons why the number of students entering university is so high and the number of students finishing degree courses is low. In 2001, 3228 students enrolled the University of Split, and the same year only 1288 received a diploma. A very similar situation occurred in the years before 2001. This shows that the degree completion rate is below 40%.

A further problem is that there is a low "pass rate". From the first to the second year of studying the pass rate is 20-30%, that is why this year is called the "selection year". For example the "pass rate" for the senior years (from third to fourth year) rises up to 80% (depending on the faculty). Because of low "pass rate", the duration of study increases from the planned four years, to six. This situation, however, is not specific to the University of Split, but it is similar for all of the universities across the country.

A further reason for such a low number of students who complete their undergraduate course relate to financial considerations.

It is not common for Croatian students to take a loan from the bank to finance the studying. In most Eastern-European countries parents support their children during the period of studying. Part-time jobs are uncommon, so to be able to work, student must do so full time, whilst attending lectures, writing essays and taking exams. This is extremely demanding and is one of the main reasons why students drop out.

3.4 Organisation of Undergraduate courses

The system of undergraduate study is usually organized in 8 terms or four years (see the table above). For each year of studying students need to pass a certain number of exams. The number of exams varies depending on the course, but usually in one year, a student must pass around 10 exams, and write two essays, in order to be able to enrol for the following academic year. Exams are usually set in written and oral form, and students must attend both parts. A certain number of exams can be held over to the next year but this number is low and the most important exams are the so called "conditions" to continue studying. Studying for an undergraduate degree is organized at the University of Split in the same way as with all of the universities in Croatia.

The approach to teaching in Croatian universities, which includes lecturing to groups of as many as 100 students, is in the process of being phased out in West European universities. There, reform has been focused on teaching small groups of students with more one-to-one tuition. At the University of Split this trend is being applied at the Faculty of Medicine which usually enrols under 50 students per year. On the other hand, big faculties such as the Faculty of Economics, or the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture enrol over 400 students per year. Consequently the first year courses in those faculties are always over-crowded.

Students who follow undergraduate programmes usually do not finish studying once the courses are completed. For example, the duration of a four-year course relates to the period when students must attend lectures. Once they have finished the programme, they still have around six months, without loosing their full student rights, where they must conclude their

exams and write a Diploma Thesis. This period can be longer, but usually a student will lose its student rights after six months. These rights include: scholarships, access to student accommodation, student food vouchers etc.

3.5 Changes in relation to Bologna Declaration

The Bologna Declaration recommends the following with regards the structure and organisation of undergraduate courses**:**

- First cycle should last a minimum of three years. The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification.

Under the proposed new Scientific and Research Higher Education Law in Croatia the following provisions regarding the structure of undergraduate course, which is in line with the Bologna Declaration is planned:

- Undergraduate studies should last three to four years, and can accumulate 180 to 240 ECTS credits.
- The title obtained after finishing the undergraduate studies will "bakaleureus" with the addition of the professional qualification
- Undergraduate courses should prepare students for Masters and/or Doctoral degrees, and should give students the possibility of gaining employment in a specific professional field.

The University of Split plans to complete the restructuring of all undergraduate studies by the start of the 2005-2006 academic year.

4. Master Degrees

At the University of Split there are two types of Masters Degree courses – Scientific and Professional. The difference is in their duration – a Scientific one usually lasts for two years and a professional one usually lasts for one year.

After finishing a four year of undergraduate programme (in any subject), a student which has attained a high grade, can choose to continue studying either at the same faculty, or at a different one. Some restrictions are in place, but in general it is possible for a Masters Degree, to not be very closely connected to their undergraduate degree.

During a Masters Degree, a student must attend full lecture courses, pass a set number of exams and write a number of papers. After successfully completing the one or two year course (depending on the type of course) the student has around six months to a year to complete the Masters Thesis.

4.1 Changes in relation to Bologna Declaration

Under the proposed new Scientific and Research Higher Education Law the following provisions regarding the structure of undergraduate course, in line with the Bologna Declaration, are planned:

- The second cycle (MA /Doctorate) should last one to two years and the student can gain 60-120 ECTS credits
- To be able to enter second cycle a student should obtain on the first cycle (undergraduate level) a minimum of 300 ECTS credits

The University of Split as stated earlier has plans to organize Master Degrees towards the ECTS by the 2005-2006 academic year

5. Doctoral Degree (Ph.D)

Doctoral Degrees vary from faculty to faculty. An organized Doctoral Degree course will last for a minimum of two years in terms of lectures courses, however generally more time is allowed to finish the Doctoral Thesis. Only a few of the faculties have a Doctoral Degree courses at the University of Split (see the table above for details).

5.1 Changes in relation to Bologna Declaration

Under the proposed new Scientific and Research Higher Education Law the following provisions regarding the structure of doctorate courses is planned. Doctoral Degree will need to last around three years, and on it's completion the academic title to be issued will be: **dr. sc** (Doctor of Science) or **dr. art** (Doctor of Art). The university will have the authority to determine the number of ECTS credits to be awarded within the course, and it will also be authorised to set the number of ECTS credits needed to submit the Doctoral Thesis.

Under the proposed law, professional doctoral studies should be organized for the duration of one to two years and could be run by the university itself. The title obtained after completing this level will be: **spec.** followed by the name of the field of specialization.

As stated earlier, the University of Split has plans to organize the introduction of ECTS at the doctoral level degree by 2005.

6. Horizontal and Vertical Mobility

The Bologna Declaration highlights the promotion of student and professor mobility by calling for the removal of obstacles to the effective exercise of free movement with particular attention to:
-for students, access to study and training opportunities and to related services;
-for professors, researchers and administrative staff recognition and valorisation of periods spent in a European context researching, teaching and training, without prejudicing their statutory rights;

Because Croatia is not currently involved in the Socrates/Erasmus programme, **Horizontal Mobility** of undergraduate students is very rare and opportunities are limited. At the University of Split, there are currently only a very small number of foreign exchange students. The main problem is that no English language courses are taught at the university at undergraduate level. The few students that are studying at the University of Split, are doing so through but private arrangements between professors rather than as part of a formal exchange programme.

This is also the case for students of the University of Split who are attending undergraduate courses abroad. Unfortunately no centralised data is available giving the precise numbers of such students, however, it is estimated to be very small.
Last year, International Relations Office staff attended a training session on the coordination of the Socrates programme in preparation for Croatia's likely entry into the Socrates network. Implementation of ECTS system will improve horizontal mobility of both foreign students attending the University of Split, and of local students attending European Universities.

By contrast, **Vertical mobility,** i.e Croatian students studying post-graduate courses abroad, is far more common, especially in the field of medicine. Foreign post-graduate study is either organised by the students themselves, often having been informed of the study opportunities by their professor or mentor, or the students win a scholarship. The Faculty of Medicine in Split sends a large number of their former students to the USA for postdoctoral studies, PhD studies or clinical residencies. Many professors from the Faculty of Medicine completed their studies in the USA themselves and with their private contacts they are arranging this kind of exchanges. It is true that some of the finished students never come back from the USA given that there are greater opportunities to continue their career, but the number, which do is of a great importance for the development of the medical science in Split.

As with the undergraduate level, one of the most common problems relating to students studying in Split, at the post-graduate level, is the fact that there are only a small number of lectures held in the English language. Foreign Universities regularly show an interest in organising student exchange programmes with the University of Split, however this is rarely possible given the language issue.

Professor mobility at the University of Split is, however, increasing. There is more and more interest on the part of our Professors, in getting involved in projects such as Tempus, CEPES, 6th Framework (which we will enter shortly), CERN collaboration (CMS detector), Uni-Adrion cooperation etc. Close cooperation between professors from the University of Split European colleagues has resulted in many joint-written articles, and research.

The Faculty of Medicine is also regularly arranging professor visit to Split where the professors in Medicine from universities and Medical Schools in the USA are lecturing in some modules in English in both undergraduate or postgraduate programmes.

7. Institutional quality culture, accreditation, and recognition of qualifications

In the new the draft law for Scientific Research and Higher education, it is proposed that a Croatian Agency for Science and Higher Education be established. Part of its many function will be to monitor and evaluate the quality control systems currently in place in higher education institutions.

The draft law states that the Agency will do this in consultation with Croatian and foreign experts. The Agency will submit its report to the National Board and National Council.
All of the University of Split's faculties have the quality of their degree programmes and institution evaluated by the National Council for Higher education. The Council forward their opinion about the quality of the institution and it's programmes, to the Minister of Science and Technology who then makes a decision regarding the accreditation of a particular course or institution. This quality control procedure is undertaken on a five-year basis.

The only faculty where the students are involved in the quality control process is the Faculty of Medicine. A Questionnaire is given to students to evaluate the quality of their professors lecturing, marking and to highlight issues of concern. The Student Union at the University of Split is planning to start a "professor marking" programme from February this year. Split's students will mark their professors lectures, knowledge transfer relations with students. Faculty Deans and the Rector of the University of Split all support the idea in order to promote a more participatory quality control culture at the university.

8. Verification of Foreign Diplomas

Currently, Foreign Diploma Verification is undertaken in Croatia by the Higher Education Institution itself, empowered by the National Council for the Higher Education. Verification is conducted on the basis of the direct bilateral and multilateral contracts held with the foreign higher education institutions.

In the draft of the new law for the Scientific Research and Higher Education it is stated that the responsibility for Diploma verification will lay with an independent Agency for Science and Higher Education (which has yet to be established), which will undertake this function in collaboration with the European Network of Information Centres (ENIC).

The University of Split has formed a board to verify foreign diplomas. The Board holds a meeting every time that there is a request for verification. The problem that the board often faces relates to the compatibility of qualifications. This is especially complex with diplomas from the USA where the spectrum of post-graduate possibilities is much wider than at the universities in Croatia. It is sometimes very complicated to verify USA-type multi-disciplinary diplomas.

With the implementation of the ECTS system and Diploma Supplement the process of verification will be greatly simplified.

V. The Organization of Physics Undergraduate and Masters Curricula at the University of Split

The CEPES instructions for this Case Study, specifically requested that there should be a particular focus on the structure and organisation of the in Physics and History courses at the University of Split at undergraduate, Master's and Doctorate level. Unfortunately, our University does not currently run a Masters or doctorate level course in either of these subjects, although as will be outlined below, a proposed Physics Master's course is currently being reviewed by the National Council of Higher Education. Furthermore, since September 2002, when the University of Zadar became an independent institution, the University of Split no longer runs a History course at undergraduate level.

It is also important to note that the University of Split has not participated in any aspect of the TUNING Project (another area specifically mentioned in the case study outline).

The following will therefore present the structure and organisation of the existing Physics Undergraduate course and the proposed Masters course.

1. Structure and Organisation of the Physics Batchelor Degree Course at the University of Split

The **Bachelors Degree course** in Physics is offered by the Faculty of Natural Sciences, Mathematics and Education.

The course can be taken in the following forms:

- Mathematics and Physics for the duration of four years.
- Physics and Technical Culture for the duration of four years.
- Physics and Informatics for the duration of four years.

After finishing one of the above courses, the student can become a high school professor in either: Mathematics and Physics, Physics and Technical Culture, Physics and Informatics or simply professor of Physics.

The take up rate for Physics course in 2002-2003 has been disappointing. Provision was made to enrol 25 students for the Mathematics and Physics course in this academic year, but only three students enrolled. Similarly, for the Physics course, only 8 of the expected 25 places were filled, and for both the Physics and Informatics and the Physics and Technical Culture only 7 out the 25 expected students enrolled.

The reason for this is that Physics is traditionally considered as a complex course of study, and post-graduate employment is currently in question given on-going High School reforms where Physics has not been given the same level of importance as it previously had. Salaries for school professors are also not high.

Content of BA Degree Course in Physics:

I YEAR

Course abbreviation	COURSE	I SEMESTAR	II SEMESTAR	Comment
M2002	Mathematics I	3+0+3		
F1011	Fundamentals of physics I	4+0+2		
F1015	Seminar on general physics I	0+2+0		3*
T5034	Physical training	0+0+2	0+0+2	2*
K1104	General and inorganic chemistry	3+1+0		
D1137	Philosophy of science	2+0+0	2+0+0	1*
M2003	Mathematics II		3+0+3	
F1021	Fundamentals of physics II		4+0+2	
F1013	Physics laboratory I		0+0+4	

F1441	Computers and operating systems		2+0+1
	Foreign language	0+2+0	0+2+0
	TOTAL:	12+5+5	11+2+10

OPTIONAL COURSES

Course abbreviation	COURSE	I SEMESTAR	II SEMESTAR	Comment
Foreign language				
D1120	English I	0+2+0	0+2+0	
D1162	German	0+2+0	0+2+0	
D1170	Italian I	0+2+0	0+2+0	
D1156	French	0+2+0	0+2+0	
D1176	Russian	0+2+0	0+2+0	

II YEAR

Course abbreviation	COURSE	III SEMESTAR	IV SEMESTAR	Comment
M	Mathematics III	3+0+3		
F1511	Mathematical methods of physics I	3+0+2		
F1034	Fundamentals of physics III	4+0+2		
F1021	Physics laboratory II	0+0+4		
F1111	Classical mechanics I	2+0+1		
D1132	Educational psychology	2+1+0	2+1+0	1*
D2314	Pedagogy	2+0+0	1+1+0	1*
D2353	English II	0+2+0	0+2+0	1*
T5034	Physical training	(0+0+2)	(0+0+2)	2*
M	Mathematics IV		3+0+3	
F1521	Mathematical methods of physics II		3+0+2	

F1411	Computational physics		2+0+0
F1421	Computational laboratory		0+0+2
F1044	Fundamentals of physics IV		4+0+2
F1033	Physics laboratoryIII		0+0+4
F1121	Classical mechanics II		2+0+1
	TOTAL:	16+3+12	17+4+14

III YEAR

Course abbreviation	COURSE	V SEMESTAR	VI SEMESTAR	Comment
F1143	Electrodynamics	2+1+0	2+1+0	1*
F1153	Quantum physics and the structure of matter	2+0+1	3+0+2	1*
F1156	Seminar on the structure of matter	0+1+0	0+2+0	1*
F1133	Statistical physics	2+1+0		
F1043	Physics laboratory IV	0+0+4		
F1611	Fundamentals of physical electronics I	2+0+0		
F1631	Experimental methods of modern physics	2+0+1	2+0+1	1*
F1718	Experimental methods in physics teaching	0+0+4	0+0+8	
D3517	Didactics	2+0+0	1+1+0	1*
	Elective physics courses (one is necessary)			
F1311	Low temperature physics		2+0+0	
F1191	Biophysics		2+0+0	
F1621	Fundamentals of physical electronics II		2+0+0	
	TOTAL:	12+3+10	12+4+11	

IV. YEAR

Course abbreviation	COURSE	VII SEMESTAR	VIII SEMESTAR	Comment
F1171	Topics in nuclear and particle physics	2+0+1	2+0+1	1*
F1711	Physics teaching methods	3+3+0	3+3+0	1*
F1211	Astronomy and astrophysics		2+0+1	
	Elective physics courses (one is necessary)			
F1331	Introduction to physics of nonlinear processes	2+0+1		
F1195	Bioenergetics	2+0+1		
F1719	Teaching practice		0+4+0	
F1371	History of physics	2+0+0	2+0+0	1*
	Elective physics courses (one is necessary)			
F1199	Medical physics	3+0+1		
F1341	Classical relativistic physics	3+0+1		
F1613	Laboratory in fundamentals of electronics		0+0+3	
F1812	Introduction to diploma thesis		2+0+0	
F1161	Topics in solid state physics	2+0+1	2+0+1	
F1164	Seminar on solid state physics	0+3+0		
	TOTAL:	14+6+4	13+7+6	

Comments:
1* - Exam is to be taken after both semesters
2* - Optional course; it is not added to the total of credit points
3* - There is no exam

Teaching methods

- frontal lectures
- laboratory activity
- quarterly seminars

At the Physics Department there are thirteen members of staff.

2. Masters Course in Didactics in Science - Physics (Science Education)

Masters Course in **Didactics in Science – Physics** (also in Chemistry and Biology) received approval at the level of the National Council for Higher Education two weeks ago. This Masters Course Degree is carried out by the Faculty of Natural Sciences, Mathematics and Education at the University of Split. The course offers training in contemporary methods of teaching and learning, aimed at training the new generation of teachers and professors in evaluating school curriculum and in the methods of developing and updating parts of existing curricula. Training would also be offered in how to design new school textbooks, and on the mentoring system of working with children.

Enrolment policy for this Masters would require an average grade at the undergraduate level, higher than 3,5 (on the scale from 2-5).

The course lasts for two years and is organized as follows:

Subject	Hours
Compulsory	**Min 30**
Contemporary movements in Physic Methodology	30
Optional	**Min 80**
Philosophy of Physics	20
Selected Areas of Biophysics	20
Physics of Condensed Matter	20
Selected Areas of Relativity of Physics	20
Selected Areas of Physics	20
Symmetry in Physics	20
Border Areas of Physics	20
Modern programming in Natural Sciences	20
Environmental Change and Hazards	20

Subject	Hours
Compulsory	**Min 40**
Psychology of Learning	20
Methodology of Scientific Research in Natural Sciences	20
Optional	**Min 50**
Didactics and Curriculum of Modern Teaching Skills	10
Methodology of Pedagogical Research	10
Alternative School Models	20
Sociology of Teaching Profession	10

Ecological Topics in Education	10
Education Economics	10
Labour Economics	10
Modern Computer Technologies in Teaching	20
Culture and Human Environment	20
Philosophy of Science	20
Science Education	20

The student will also be able to choose one subject from the other courses offered within this programme.

This Masters course is anticipated that students from different faculties studying different Masters degrees will be able to enrol to any of the given subjects. It is also planned that the ideal number of students enrolled in to the course should be no more than ten.

VI. The Structure and Organisation of Joint Degrees at the University of Split

This section of the case study will focus on the two joint degree courses run at the University of Split.

The reason for this extensive focus is that these courses, which are run in partnership with Western European Higher education institutions, are structured towards European standards and contain key elements of the provisions of the Bologna Declaration including an ECTS. They are also two of the most progressive courses offered by the University.

1. Joint Degrees

At the Prague meeting in 2001, special emphasis was placed on the Joint Degrees offered in a partnership by institution from different countries and leading to a recognized Joint Degree. Joint Degrees are more common at Masters and PhD levels that at first degree level, or outside the university sector. These programmes are usually based on bilateral inter-institutional rather than intergovernmental higher educational agreements**. (Dujic,Z 2002)**

2. Joint Degree 1: Science and Technology of the Environment and Territory

This degree is offered by the Faculty of Natural Sciences, Mathematics and Education, in partnership with **University of Molise (Italy)** and **Valahia University of Targoviste (Romania).** The first course began in 2000 and will end in 2003.

2.1 Description and Aims of the course

The course is concerned with the interrelationships among the natural environment, natural resources and human society. The goal of the course is to educate students to be sensitive and knowledgeable about complex environmental issues facing contemporary society.

2.2 Teaching Methods

During the course the following methods are used:

-frontal lectures

-field exercises

-laboratory activity

Students must take both compilation and multiple choice tests. For frontal lectures a wide use of multimedia are used, and interactive systems; the software used as learning tool includes the following:

- A central module for students to navigate through course materials. The schedule is organised mostly by time frames (the lectures are available on the web every week). The schedule links students to readings, assignments and quizes.
- An interactive, facilitated environment for students to have discussions among each other and with the professor, to share information and to complete team tasks and assignments. The "CourseRoom" allows participants to work in teams and support public and private discussions. The "CourseRoom" uniquely supports and enables collaborative learning that is both student-to-student and professor-to-student.
- A collection of student descriptions that includes contact information, photographs, education and experience, and interests. This application allows students to create a "home page" of information about themselves.
- An evaluation tool for the professor to privately test and receive feedback on student performance at the end of the week. Quizzes are posted in the schedule and are e-mailed back in a data base only accessible by the professors. Professors can review, grade and provide feedback to students.

To facilitate the transmission of the lectures on the web, the software allows to compress hours of transmission into a few minutes. Foreign students are able to decompress the lectures received and use them as they think proper.

Seminars are be available through video-lectures in each foreign University and will be eventually certified by means of oral and written tests taken under the direct control of the professor in the room.

This evaluative process is a part of each teaching program.

Foreign students must take evaluative tests at their own University in the presence of a board made of Italian and foreign examiners who function as tutors.

Practical exercises are concentrated during the summer. Foreign students will join Italian students for common field exercises.

Other practical demonstrations filmed in laboratories will be sent to foreign students as file videos.

This didactic system is held for each of the three years; to prepare the graduation thesis will be used different strategies to be defined during the course.

2.3 Aims and Professional Profile

Students receiving basic training in all aspect related to the environment and its interactions with the community. They are able to identify and study the interaction between human and non-human systems, and to analyse and manage ecological processes, environmental system, natural resources, and to apply field methodologies.

Therefore, graduates will possess a broad basic environmental culture, and will be able to interact with experts in various disciplines. Their training is devoted to sampling, analysis and monitoring natural, semi-natural and human ecosystems and to the organisation and interpretation of data, with particular reference to the ecological disciplines. They will also possess the technical, scientific and professional expertise necessary to the management and interpretation of territorial information.

Graduates in Environmental Science will be expert in the evaluation and management of environmental system and land management they will also receive training in the basic disciplines of the course (mathematics, physics and chemistry) and their links with the disciplines of agricultural, economics, legislation. They will also study those aspects of the natural disciplines essential for the development of a holistic view of the environment.

2.4 Professional Opportunities

Graduates will be able to pursue a career in the public or private sectors on local, national and international level. The program is designed to prepare individuals for careers in business, industry or government; or to pursue graduate studies in environmentally-related sciences, low, public health or business. The curriculum provides a wide scope of instruction which enables students to explore various disciplines and professions involved with environmental issues.

2.5 Duration and Contents of the Course (including credit system)

This three-year course consists of 25 courses for a total of 180 ECTS credits. It consists of lessons (using multimedia technology), theoretical and practical exercises, seminars, monographic courses, guided activities, technical visits (during internships in Italy), partial evaluation tests, and correction of essays. Courses are devoted to a single discipline or, in the case of modules, several disciplines (integrated course). At least three credits are awarded for each single-discipline course. The integrated course consists of coordinated didactic modules for a maximum of nine credits also awarded by more than one teacher and with a single final examination.

Students may shape their own programme depending on their aims. The course is structured in “basic training” (46 credits) and “profession orientated training” (58 credits). Integrative disciplines (42 credits), activities chosen by the student (9 credits), and other activity (9 credits) complete the course. The total of the credits including the final examination (16 credits) amounts to 180, which corresponds to the Level 1 degree.

The academic year is divided into six-month periods, each lasting at least twelve weeks. The three-year course includes:

1. Elements of mathematics, statistics, computer science and physics applied to the organisation, management and elaboration of analytical data.
2. Elements of microbiology, biochemistry and applied biology, chemistry, soil science, lithology and geology that will enable the student to interpret complex abiotic and biotic phenomena.
3. Elements of ecology, environmental botany, impact evaluation, nature conservation and landscape ecology that will enable the student to address problems related to the evaluation and management of environmental system.

2.6 Application Procedures

The enrolment is regulated by the laws for governing university enrolment in Croatia. The number of enrolment per course is established by the Academic Senate, upon the proposal of the Faculty Council, depending on the structures available, professional opportunities and according to the general criteria established by the Ministry of University and Scientific and Technological Research.

2.7 Degree examination

The degree examination, which is governed by the rules established by the partner Universities, comprises of an oral examination relating to the activity carried out within the framework of the internship and/or through a thesis on a topic agreed with the tutors. Students must pass the examinations required in their given disciplinary area in order to sit the final examination.

First level course degree in Science and Technology of the Environment and Territory – Summary Table

Courses	Lectures (credits)	Laboratory (credits)
I year – I semester		
Mathematics	**7**	
Zoology	**7**	**1**
Physics	**7**	
Plant morphology and physiology	**7**	**1**
I year – II semester		
Inorganic and general chemistry	**7**	**1**
Geology	**6**	**1**
Foreign language	**6**	**1**
Informatics	**7**	**1**
II year – I semester		
Organic chemistry	**7**	**1**
Statistics	**7**	
National legislation	**4**	
Biochemistry	**4**	
Physical geography and geomorphology	**6**	**1**

II year – II semester		
General and environmental microbiology	**6**	**1**
European legislation	**4**	
Applied biology	**4**	
Ecology	**5.5**	**2.5**
Environmental botany	**6**	**1**
III year – I semester		
Cartographic analysis and geographical information system	**4**	**2**
Analytical chemistry	**3**	**2**
Soil sciences	**5**	**2**
Environmental economics	**4**	
III year – II semester		
Engineering geology and hydrogeology	**5**	**1**
Conservation of natural resources	**4**	
Landscape ecology	**4**	
Environmental impact assessment	4	
Optional courses	**9**	
Practical activities	**9**	
Final evaluation	**2**	
Total		**180**

*(Valahia University of Targoviste, University of Sarajevo, University of Molise, University of Split, 2000)

3. Joint Degree 2: International (European) PhD programme in Environmental Physiology

This course is designed by the Medical Faculty of the University of Split in partnership the Medical Faculty of Norwegian University of Science and Technology, (Trondheim). It is due to run its first course module in 2004.

The diplomas / PhD degrees will be awarded jointly by the institutions participating in the programme. At a later stage, it is the intention of the partners to involve other institutions in the programme.

The MD/PhD programme will have all its courses expressed in ECTS credits, allowing for free exchange of students and /or professors with other major universities in Europe.

6.3.1 Course Description

It is a research and thesis based integrated post-graduate degree programme in Environmental Physiology. This, yearly 60 credit, four year, period of study is concerned, exclusively, with basic research training and comprises of compulasory courses together with optional courses dependent upon the student's research specialization. The four years postgraduate programme is based upon a Master's degree or equivalent, preferably with a biology related major, or a medical degree. The programme is connected to ongoing research at the participating universities.

Environmental physiology is the study of how the organism reacts to changes in the external environment. How the organism is able to do this can give important information about the regulatory mechanisms present both during heath and disease.

Preventive medicine is an area with increasing importance. It is usually concerned about how various external factors can lead to disease.

6.3.2 Programme Goals

1 To train students in Environmental Physiology to a level where they are able to perform independent research in the field as well as to supervise and teach undergraduate students on the subject.
2 To establish a collaborative network of Universities in Europe in the area of Environmental Physiology.
3 To develop research collaborations to place the participating European university as the leading institutions in this field, in particular as this is related to preventive medicine.

The course will offer a doctoral education that takes approximately four years after a MSc or MD degree.
Students will be offered extensive guidance. This is provided by having an intensive introductory course and giving the students follow up both by their thesis supervisor and the faculty of the programme.

6.3.3 Course structure

The programme will mainly, but not exclusively perform research and teach in the following areas:

Environmental Physiology:

1. Diving and hyper baric physiology and medicine
2. High altitude physiology and medicine
3. Space physiology and medicine
4. Thermal physiology
5. Basic and advanced exercise physiology

6. Exercise physiology in disease, rehabilitation and ageing

6.3.4 Entrance Requirements:

1. Masters degree or equivalent in a biological related subject
2. MD or equivalent
3. Medical students with at least two years of medical school accepted for the research program in Medical Technology.
4. Medical students with at least two years of medical school accepted in a combined MD/PhD program

The students are required to pass an entrance exam in basic and molecular physiology, in particular related to circulatory and respiratory physiology. The exam will ensure that all of the students have similar background knowledge at the start of the course.
At the end of the first semester each student will have to select a specific field of study as well as a mentor among the faculty. The research projects will be part of the ongoing research at the participating institutions, but here will also be opportunities to perform research at other laboratories.
For the first course a maximum of 10 students will be accepted.

6.3.5 Teaching methods

1. Lectures
2. Problem based learning in groups: based on real problems to allow students to search for information on their own
3. Seminars
4. Practical exercises, demonstrations in laboratories.

All teaching material will be available on the web. A website with a chat-room will be established for exchange of material and views.* (Z.Dujic,2002)

7. CONCLUSIONS and SWOT ANALYSIS

The case study outline suggested that the "Conclusions" section should focus on our institution's main achievements and developments in promoting curricular reform in view of the provision of the Bologna declaration.

The key achievements and developments to date, which have been highlighted above can be summarised as follows:

- The University of Split is in the process of establishing a 'Board for International Relations and ECTS', led by a coordinator who will work with faculties to prepare them for the restructuring of degree courses and curricula, and facilitate the process of introducing the ECTS and Diploma Supplement. The timeframe that the University has set for implementing the ECTS at the Doctoral level is 2004-2005, and 2005-2006 for undergraduate and Master programmes.
- The ECTS has already been introduced in a Joint Degree Masters level course - **Science and Technology of the Environment and Territory,** which is being run in collaboration with partner universities in Italy and Romania. In addition, the ECTS will be central to two proposed courses – the PhD Programme in Environmental Physiology, which is due to begin shortly in partnership with a Norwegen partner institution, and a Masters degree in Science Education for Physics.

- The two above-mentioned Joint Degree programmes have introduced interactive and modern approaches to post-graduate study based on Western European models, founded on Bologna Declaration principles.

These are modest, yet solid initial achievements, and as has been emphasised throughout the paper, the process of reform at the University of Split, in the direction of the Bologna provisions, is likely to accelerate once the proposed law for Higher Education (which incorporates all the elements of the Declaration) is ratified. An additional process which will focus attention on reform in this direction will be the University's **Five Year Strategic Plan** which is due to be finalised in the coming months.

To conclude, it may be useful to the reader, to present a brief analysis some of the University of Split's key **Strengths**, **Weaknesses**, **Opportunities**, **Threats** (SWOT Analysis), in relation to the required reform of its management, administrative, degree course and curricula structures, in line with the Bologna Declaration. This will provide a picture of the institutions internal and external operating environment, and will help the reader to understand some of the elements which could facilitate the reform process as well as some of the key difficulties and challenges.

Strengths (Internal)
The University of Split:

- has a number of senior management personnel who are committed to the reform process and who have been actively involved in developing and commenting on the national level draft Law for Higher education
- key university staff are networked into international and European organisational structures which are promoting reform such as: UNCESCO-CEPES, the EU (TEMPUS) UNI-ADRION, FP6
- is a relatively small institution and so a wide-ranging reform processes may be easier to coordinate
- is currently piloting / plans to pilot, a number courses which introduce elements central to the Bologna Declaration (e.g Joint Degrees, ECTS)
- is in the process of establishing an **International Relations and ECTS Board,** which will drive the process of introducing Bologna related reforms over the coming years

Weaknesses (Internal)

- It is widely felt that senior management as well as academic and administrative staff currently have an unmanageable workload, which is likely to increase significantly with the introduction of a wide-ranging reform process
- There is a general feeling of apprehension and uncertainty regarding such a wholesale process of change
- It is recognised that there is likely to be an important level of resistance to degree course and curricula reform (including the introduction of **ECTS**) amongst certain members of the academic staff
- the lack of courses taught in English at undergraduate and post graduate level is having a negative effect on the level of possible vertical and horizontal mobility towards the university

Opportunities (External)

- the University is a pilot institution within the UNESCO-CEPES/EC programme and as such is receiving direct technical guidance and assistance in the initial stages of the reform process
- the University is also receiving external technical support from, and cooperating with the EU Tempus programme and will be part of the FP6 programme and possibly Socrates/Erasmus
- A new motor-way, which should be completed by 2005 (Zagreb-Split-Dubrovnik), will help communications between North and South of Croatia. This will not only facilitate links and information exchanges with other Croatian institutions who are undergoing similar reform processes, but will have a positive impact on the mobility of students to and from the region.
- The eventual ratification of the law for Scientific Research and Higher Education (which should be passed in Spring 2003) will a) create the national framework for reform in line with the Bologna Declarations b)increase the level of support from the Ministry of Science and Technology to the University

Threats (External)

- An extended delay in the ratification of the proposed law for Scientific Research and Higher Education (including possible change of government)
- insufficient funding and technical support from central government to support the reform process
- insufficient external technical assistance to support the reform process after the completion of the UNESCO-CEPES programme

It's important to re-emphasise that the University of Split is in the very first stages of the reform process. There is a strong commitment amongst senior management to work towards achieving the reform objectives which will be set out in the new law (in line with the Bologna Declaration), however it is recognised that this process will face numerous challenges and obstacles. Of critical importance is that our institution receives continued internal and external technical and financial support, to further develop our capacity to manage this complex transition.

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Note: - much of the information contained in the above document was gathered through formal and informal discussions with senior University of Split management-level staff. The resources were also consulted:

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