

***UNIVERSITY OF JOSIP JURAJ STROSSMAYER IN OSIJEK  
FACULTY OF CIVIL ENGINEERING IN OSIJEK***

**PROPOSAL**

**of the postgraduate doctoral studies**

**Doctor of technical sciences in scientific field  
Civil Engineering**

***Osijek, May, 2005***

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## 1. INTRODUCTORY PART

University education of civil engineers in the region of East Croatia reaches back into the year 1967, when the department of the Technical College Zagreb was established in Osijek. This department has been active in the region up to 1976 when, as a part of the Educational Centre for Civil Engineers, the Civil Engineering College Osijek was established. The Civil Engineering College was separated from the Civil Engineering School in 1982 and in **1983** it was merged with the Department for Materials and Constructions Osijek into the **Faculty of Civil Engineering Sciences of the Osijek University**. Since then the Faculty has been active within the Civil Engineering Institute Zagreb and after its transformation during the Homeland War in 1991, the four independent units in Zagreb, Split, Rijeka and Osijek were formed. With the separation of the Civil Engineering Institute of Croatia from the Business centre Osijek, the independent **Faculty of Civil Engineering Osijek** was founded in **February 7, 1992**.

There have been major breakthroughs in 1988 when the Faculty employed a greater number of scientists and experts from different civil engineering fields. Many of them are among best in Croatia and some even have a worldwide scientific recognition. Today they make the basis of the high-quality postgraduate studies of civil engineering.

The Faculty staff has been active in the community life by taking part in those kinds of engineering work that demand specific knowledge and experience: reviews, environmental protection studies, geodetic and geotechnical measurements, and measurements of the seismic response, structure testing, architectural recording of protected structures and engineering objects, and innovations in the production of engineering structural elements. The revenue coming from the scientific-research work in the economy makes more than 20 % of all the Faculty revenues, which approximately corresponds the trends at other university institutions in the world.

International cooperation is also very important. At the moment three international research projects are being conducted at the faculty, which include American, German and Slovenian partners. A contract about the partnership in the realization of CARDS project "Sustainable development of family farms in Baranya" was also signed in March. Many Faculty members were staying as visiting lecturers and co-workers on the projects of two European and two US universities. Some Faculty members were awarded scholarships at some prominent European (ETH, Vienna, Utrecht, Stuttgart, Hagen) and US universities (Penn State, Berkeley, Purdue, Illinois). The Faculty also sends a representative of Osijek University in the European University Association and cooperates with the Pecs University in Hungary with which it has preliminary agreed to organize joint postgraduate studies of civil engineering (official language – English).

Our students participate in the IAESTE programme of students' exchange and during the last 5 years more than 30 students were exchanged and at the same time our faculty hosted five foreign students. Three students took part in the international CEEPUS programme.

### 1.1. Reasons for the Faculty Initiation

The main purpose of the studies is high-quality scientific education in three scientific branches of the civil engineering scientific field (according to the Book of regulations on defining the scientific fields N.N. 29/97 from March 14, 1997) and writing a doctoral dissertation, which presents the original scientific contribution. Study curriculum is designed

under provisions of the article 78 of the scientific work and university education statute (N.N. 123/03 from July 31, 2003), whereas Realization plan of the studies enables evaluation of teachers' competency. Upon examination of the lists, goals, and contents of the courses, as well of the recommended literature, it can be concluded that the suggested programme enables high-quality postgraduate civil engineering studies in the suggested fields of specialization, and professors' biographies can additionally guarantee the quality. The programme has been coordinated with the corresponding postgraduate studies in the USA.

#### *1.1.1. Needs of the Labour Market*

There are several basic reasons for initiating the studies and the most important one is based on the needs analyses of the labour market. According to the Regional Employment Office in Osijek of the Croatian Employment Bureau, there were **no unemployed civil engineers in the region of Slavonia-Baranya County in December 2004**. Reputable civil engineering firms, which employ many workers are often limited with the lack of qualified workers, so that some public (Croatian Waters) and private (APZ Zagreb) firms give scholarships to third- and forth-year students. From time to time they also do «head hunting» among best students offering them jobs. For the purpose of better communication, in 2001 AMCA-FA-Mursae, the association of former students of Civil Engineering Faculty was founded. According to AMCA-FA-Mursae more than 90% of our former students work in the region of Slavonia. They work as junior researchers, teachers in secondary schools, in civil engineering firms, design offices, in the Civil Engineering Institute of Croatia, public companies, in management and abroad.

The suggested postgraduate studies encompass the whole scientific education of civil engineering, which ensures the renewal of the scientific-research stuff at the Faculty and in the whole region.

#### *1.1.2. Connection with Modern Scientific Concepts*

The new study programmes are based on the long-time and diverse scientific work of our employees in Croatia, as well as on the cooperation with European and non-European scientific and educational institutions. Currently nine scientific-research projects financed by the Ministry of Science, Education and Sports are being carried out at our Faculty. There are also three international projects, which involve American, German and Slovenian partners. The projects deal with very diverse topics and comprise the problems of earthquake engineering, timber and concrete structures, soil mechanics, as well as different economical aspects of civil engineering. Scientists of the Faculty of Civil Engineering in Osijek take part in the three **TEMPUS** projects: the first one dealing with the coordination of civil engineering education in Croatia with the Bologna Declaration, the second one with the quality of the university education and the third one with the application of the Bologna Declaration at the Osijek University. The Faculty is a partner in **CARDS** inter-border cooperation projects of the sustainable development of Baranya family farms, with the accent on the preservation of the landscape of Baranya villages.

#### *1.1.3. Comparison with Foreign University Study Programmes*

The study program is written as a part of the **TEMPUS** project «**Restructuring and Updating of Civil Engineering Curriculum, TEMPUS JEP NO. 17062-2002**» on which all four civil engineering faculties in Croatia are engaged, together with the international

consortium of 10 European faculties. This cooperation, as well as the active participation in the adaptation of study program of engineering studies in Croatia, organized by the Ministry of Science, Education and Sports, led to the coordination of all the suggested program of civil engineering faculties in Croatia (November 2004). The differences in the undergraduate study program were less than 10%.

The program is in accordance with the study program of many European and American civil engineering faculties. We used the guidelines of professional organizations, which, in some countries, define engineering competencies. We mostly followed the instructions of **EUCEET (European Civil Engineering Education and Training**, which embraces 136 scientific institutions of which more than 100 civil engineering faculties are in Europe (EUCEET projects «Harmonizing Engineering Education Across Europe» 2004). We also coordinated the program with the guidelines of **SEFI (European Society for Engineering Education** project: »Enhancing Engineering Education in Europe, Innovative Curricula in Engineering Education 2003), with the standards of the German institution for accreditation of university program in civil engineering **ASBau (Akkreditierung und Qualitätssicherung zeitgemässer Studiengänge des Bauingenieurwesens an deutschen Hochschulen)** from 2003, and with the criteria for accreditation of engineering program in the USA (**Engineering Accreditation Commission, Accreditation Board for Engineering and Technology (ABET)** from 2003 and 2004.

The compilation of **the Bologna Declaration**, the recommendation of the **ASCE Body of Knowledge** committee and the results of EUCEET study of the basic content of the civil engineering studies, represents the fundamental criterion needed for defining professional knowledge necessary to any civil engineer.

The studies can be compared with the postgraduate studies in the USA: University of Illinois at Urbana/Champaign, Purdue University, Indiana, University of California at Berkeley and with Technische Hochschule Graz, ETH Zuerich, Technische Universitaet Darmstadt, and TU Stuttgart.

#### *1.1.4. Potential Partners Outside the Institutions of Higher Education*

Outside the higher education system there is an interest for study program, particularly in the form of the continuous engineering education. During 2003 and 2004 the Faculty of Civil Engineering in Osijek has initiated and realized **the CARDS project of the life-long education** of civil engineers, which at once embraced more than one thousand civil engineers in the region of eastern Croatia. The life-long education of civil engineers in the region is supported by regular organization of scientific and professional lectures and by publishing of textbooks, mimeographed course materials, monographs for students and civil engineers.

### **1.2. Past Experience in the Implementation of Postgraduate Doctoral Studies and other Postgraduate Studies**

29 years of experience in educating civil engineers in Slavonia, makes the Faculty of Civil Engineering Osijek one of the prominent faculties of Josip Juraj Strossmayer University, widely recognized in Slavonia, Croatia and Europe. This fact has become evident in the increased interest of students for the studies at the Faculty of Civil Engineering in Osijek and in the tendency of shortening the time of the studying. According to the present situation at the Faculty, the quality of curricula of the undergraduate and postgraduate studies, the success of the scientific and teaching workers, co-workers and other faculty members in all fields of

their work, and successful managing with the revenues, the Faculty has proved its seriousness and high position in university education and science in Croatia.

During the last 29 years of the Faculty, over **1100** students have become **civil engineers**, almost **300** of them have become **Bachelors of Science in civil engineering**, and **4** candidates have acquired their **doctoral degrees in technical sciences (Ph.D.)**. Since 2001 postgraduate (Master's degree) studies have been organized in the following fields of specialization: Supporting Structures, Construction Management and Technology and Hydraulic engineering. Doctoral curricula in the above mentioned fields of specialization have been reviewed but due to some changes in the legislation, they had never been started.

The new postgraduate study program of the Civil Engineering Faculty in Osijek follows the tradition of high-quality university education of civil engineers in our region and it is in accordance with the modern European (the Bologna Declaration) and world trends.

### ***1.3. Openness of the Studies towards the Mobility of Students***

In 1993 the Civil engineering studies, with its first autonomous program, have already been declared as an «international program». Today it continues to aim toward the openness of the studies and mobility of students. As a result of these aspirations several dozen foreign students have graduated at our faculty. Moreover, the mobility of students is ensured by the agreement on coordination and mutual acknowledgment of the curricula at all civil engineering faculties in Croatia and the coordination of program with European standards (see the table 1) enables mobility on the European level. Besides, this mobility is also enabled by the possibility of conducting some lectures in English language (see the study program). Also a part of scientific and educational employees is involved in teaching at other faculties of University of Josip Juraj Strossmayer in Osijek, as well as in teaching at other postgraduate studies (interdisciplinary specialized postgraduate studies at the university, postgraduate studies at the Faculty of Civil Engineering in Zagreb, and the like).

Mobility of the postgraduate candidates is ensured by inter-university contracts (in Croatia and beyond) which will ensure that every postgraduate candidate is engaged in the scientific-research work at some other faculty for at least one semester.

### **1.4. Possibility of including the studies or their parts in the joint study program with foreign universities**

Modular structure of the studies enables inclusion of some courses in joint study program with foreign studies. Some courses can be offered as courses for continuous education or they may fit well into international specialized studies. This particularly refers to the universities, which with their regional position facilitate the exchange of teachers and students (Janus Pannonius University in Pecs, The Tuzla University).

### **1.5. Other elements and needed information**

The suggested postgraduate program is of high-quality and the competency of the suggested teachers guarantees that the defined goal will be realized: to enable a student for doing independent top-quality scientific work with its original and important scientific contribution.

## **2. GENERAL PART**

### **2.1 Title of Studies**

University of Josip Juraj Strossmayer in Osijek, the Faculty of Civil Engineering offers the following study program:

***University Postgraduate studies of Civil Engineering  
for earning the academic degree - doctor of technical sciences of the second degree  
(180 ECTS credits)  
scientific field: Civil Engineering***

### **2.2 Organizer of the Studies and other Institutions involved in Initiating and Realization of the Doctoral Studies**

The Faculty of Civil Engineering of Josip Juraj Strossmayer University in Osijek is in charge of the postgraduate studies. The classes are held in cooperation with the Department of Mathematics and Department of Physics of Josip Juraj Strossmayer University in Osijek.

#### ***2.3. Institutional strategy of the doctoral program***

Doctoral studies encompass the whole civil engineering education in the eastern part of Croatia. The education of our own staff insures the renewal of scientific and educational stuff for future generations and for the continuation of scientific and research work.

### **2.4. Innovativeness of the doctoral program**

#### ***2.4.1. Interdisciplinary character***

This study program strongly emphasizes the possibility of offering non-civil engineering students (within technical or outside of technical profession) the contents which are important in the application of new perceptions and technologies but are missing in their present education.

#### ***2.4.2. Collaborative character***

Among others, one of the goals of our Study program (according to the Bologna Declaration guidelines ) is to increase the horizontal and vertical mobility of students within the University, but also between Osijek University and other Croatian and European universities which offer similar doctoral program) Civil engineering faculty in Osijek bases its scientific cooperation on the contract between the civil engineering faculties in Croatia (Zagreb, Rijeka, Split and Osijek), as well as on the contracts with university institutions which are members of the previously mentioned TEMPUS program.)

#### ***2.4.3. Partnership with industry and business sector in the initiation and realization of the***

## *Doctoral program*

National strategy of Croatia is based on the society of knowledge. Precondition for this strategy is the existence of smaller and bigger learning organization systems. The primary goal high education in general, and thus the doctoral studies of civil engineering, is to give a student knowledge and skills which will enable him to answer the ever- growing demands of some economic aspects, that is, the surrounding as a whole. The study program is based on the connection between knowledge and practice with the purpose of the efficient including of scientists into very complex jobs. Its further purpose is to qualify them for efficient work in changing conditions of the modern society, as well as to qualify them to deal with scientific changes accordance with their achieved knowledge.

### **2.5. Admission Policy**

Postgraduate doctoral studies of civil engineering can enter:

- persons who have finished university graduate or undergraduate studies, in the domain of technical or natural sciences – field Mathematics or Physics (*Bachelor's or Master's degree*)
- persons who have finished university postgraduate studies in the domain of technical or natural sciences– field of Mathematics or Physics (*Master of Science*)
- person who have not finished university graduate studies in the domain of technical sciences, and persons who have finished university degree studies in other domains have to register two technical courses from the university graduate studies of the Civil Engineering faculty, important for understanding the teaching and fulfilling the obligations for postgraduate doctoral studies. These courses are defined by the Faculty council, and the students are obliged to pass the exams during the first year of the studies.

### **2.6. Criteria and selection procedures**

If the number of postgraduate candidates who want to enter the postgraduate doctoral studies is bigger than the defined capacity (enrolment quota), the selection of postgraduate doctoral studies is performed by a qualifying entrance exam. In the qualifying procedure an average point grade of the finished university graduate or undergraduate studies is evaluated and the candidates are enrolled according to the ranking position based on the qualifying procedure.

### **2.7. Competencies achieved by finishing the studies, the possibility of the continuation of scientific research work, possibility of postdoctoral improvement, and the possibility of finding employment in a private and public sector**

#### *2.7.1 Competencies*

##### *Competencies of a **Doctor of Civil Engineering**:*

This study ensures achieving high-quality scientific education in the field of civil engineering based on scientific researches, the study program and by taking part in organized scientific-research activities. By writing a doctoral dissertation one gives his/her original scientific contribution and is proved as a scientist in his field of research.

*A **Doctor of Civil Engineering** is qualified for the following work:*

A doctor of technical sciences in the field of civil engineering is qualified for doing independent high-quality scientific work, possesses and independently uses top-quality knowledge in the field of civil engineering and other similar technical sciences, and gives with his/her inventive work a contribution to his/her profession.

#### *2.7.2. Possibility of postdoctoral improvement and the possibility of finding work in a private and public sector*

Postdoctoral improvement is enabled through active participation in the realization of active scientific projects, or applied scientific projects, doing one's own with the use of Faculty premises and equipment.

Employing a doctor of science is possible in a public (faculties, institutes) or private sector (civil engineering companies, institutes). The need for high-education experts will grow with Croatia's approaching European union and its inclusion in the international exchange of work and knowledge.

### **3. DESCRIPTION OF THE STUDY PROGRAMME**

#### **3.1. Structure and Organization of the Postgraduate Doctoral Studies**

When entering the studies, a postgraduate student chooses his/her **tutor** among all the professors. He or she helps him/her chooses particular courses, solve some problems and advises him/her during the studies. The tutor does not have to necessarily be his/her mentor for doctoral thesis.

Postgraduate doctoral studies have a modular system of teaching, so that a student himself/herself can choose the modules from three scientific branches: A) Supporting Structures, B) Construction Management and Technology, and C) Hydraulic Engineering. The study consists of three elements: regular classes, independent research work and writing a doctoral thesis.

Research work for the doctoral thesis is the mainstay of the students' scientific work. The doctoral thesis should not only be the proof of the successful study completion, but it should also represent a real and important global contribution to the science and be the basis for innovative progress of any country. In these terms, a doctoral thesis represents a fundamental part of the doctoral studies. Classes only help students to make their work of high quality and do not give them any extensive knowledge (in great details). Research work begins in the II semester: its preliminary results can already be obtained in the IV semester and final results after finishing the doctoral dissertation. According to the students' interests and needs of the organization they work in, they have the possibility to choose the courses from several branches.

In a consultation with a student, a tutor and a head of a particular department make a decision about the courses a student should take in the certain semester. Extracurricular activities are carried out in the IV and V semester by a student himself/herself and in the cooperation with his/her tutor. Registration for the doctoral thesis implies the required information about the character of the thesis and its contribution to the scientific field it applies to. The quality of the doctoral thesis is controlled in the same way and the information about the thesis is



released on the web site of the Faculty so that every interested person can be informed about it.

There are three semesters at the Studies and students choose nine optional courses. All the courses earn **6 ECTS credits**, so they acquire 90 ECTS credits.

Independent research work begins by entering the studies and in the IV semester a student should publish his/her scientific work in some magazines, make patents or take part in the scientific projects on some other universities, which carries 42 ECTS credits. In the V and VI semester he/she continues to do research work and begins to work on his/her doctoral thesis, which carries the last 90 ECTS credits necessary for study completion.

Specialization field for a doctoral thesis is determined according to the courses students have chosen and their number (at least 6 courses must be from the civil engineering branch).

### 3.2. A list of all optional courses with number of hours per week and ECTS credits

Table 1. *Structure of the studies with corresponding ECTS credits and a timetable*

#### ***I SEMESTER***

|                             | <b>Course</b> | <b>Hours a week</b><br>Lecture +<br>practise | <b>ECTS<br/>credits</b> |
|-----------------------------|---------------|--|-------------------------|
| <b>optional<br/>courses</b> | 5 courses     |  |                         |
| <b>total of all courses</b> |               | 10,00+10,00                                  | <b>30,00</b>            |

#### ***II SEMESTER***

|   | <b>Course</b> | <b>Hours a week</b><br>Lectures +<br>practise | <b>ECTS<br/>credits</b> |
|---|---------------|---|-------------------------|
| <b>optional<br/>courses</b>                       | 1 - 3 courses | 2+2 to 6+6                                    | <b>6-18</b>             |
| <b>scientific<br/>research</b>                    |               |   | <b>12-24</b>            |
| <b>total of all courses + scientific research</b> |               |   | <b>30,00</b>            |

#### ***OPTIONAL COURSES***

All optional courses earn **6 ECTS** credits.

Optional courses are from the following fields of specialization:

**O** - General courses

**K** - Structural subjects

**OTM** - Construction Management and Technology

**H** - Hydraulic Engineering

Table 2. *Courses:*

|          | <b>Course</b>  | <b>Field of specialization (branch)</b> |
|----------|--|---|
| 1.05-107 | Equations of Mathematical Physics                            | <b>O</b>                                |
| 1.05-108 | Numerical Mathematics  | <b>O</b>                                |
| 2.05-220 | Reliability Engineering                                      | <b>O</b>                                |
| 2.05-221 | Models of Non-linear Material and Structure Behaviour        | <b>K</b>                                |
| 2.05-222 | Serviceability Limit State of Reinforced-Concrete Structures | <b>K</b>                                |
| 2.05-223 | Earthquake Engineering II                                    | <b>K</b>                                |
| 2.05-224 | Structural Dynamics II                                       | <b>K</b>                                |
| 2.05-225 | Masonry Structures III                                       | <b>K</b>                                |
| 2.05-226 | Timber Structures III  | <b>K</b>                                |
| 2.05-227 | Soil Dynamics and Foundation Engineering                     | <b>K</b>                                |
| 2.05-228 | Modelling in Steel Structures                                | <b>K</b>                                |
| 2.05-229 | Theory of Structure Durability                               | <b>K</b>                                |
| 5.01-105 | Economic Aspects of Investments                              | <b>OTM</b>                              |
| 5.01-109 | Structure Management   | <b>OTM</b>                              |
| 5.01-110 | Planning and Preparation of Building Production              | <b>OTM</b>                              |
| 5.01-111 | Operational Researches in Civil Engineering                  | <b>OTM</b>                              |
| 5.01-106 | Small and Medium Enterprises                                 | <b>OTM</b>                              |
| 5.01-107 | Market Strategy  | <b>OTM</b>                              |
| 5.01-112 | Technology of Environmental Engineering                      | <b>OTM</b>                              |
| 5.01-113 | Modelling of Construction Processes                          | <b>OTM</b>                              |
| 5.01-108 | Strategic Management   | <b>OTM</b>                              |
| 2.05-317 | Wastewater Treatment Methods                                 | <b>H</b>                                |
| 2.05-318 | River Basin Management                                       | <b>H</b>                                |
| 2.05-319 | Environmental Risk Evaluation and Management                 | <b>H</b>                                |
| 2.05-320 | Special Chapters of Hydrology                                | <b>H</b>                                |
| 2.05-321 | Water Resources System Analysis                              | <b>H</b>                                |
| 2.05-322 | Ground Water Transport Processes                             | <b>H</b>                                |
| 2.05-323 | GIS and Spatial Data Analysis                                | <b>H</b>                                |
| 2.05-324 | Ecohydrology   | <b>H</b>                                |
| 2.05-325 | Application of Expert Systems on Hydrotechnical Engineering  | <b>H</b>                                |

### 3.3. Obligatory and optional activities (taking part in seminars, conferences and round-table talks) and criteria for their equivalents to ECTS credits.

Table 3. *ECTS credits for scientific work*

|   |    |
|---|----|
| Reviewed original scientific paper in a foreign magazine  | 42 |
| Reviewed original scientific paper in a Croatian magazine | 12 |

|   |    |
|---|----|
| Reviewed scientific paper and its presentation in an international conference | 12 |
| Teaching in the faculty (min 1 semestar)                                      | 12 |
| Patented results of scientific research work                                  | 42 |
| Researching in the projects in the other universities (min 1 semestar)        | 42 |

### 3.4. Description of every course and/or modulus

#### Appendix 1. *Course data*

### 3.5. Rhythm of studying and students' obligations

During the first three semesters a student is obliged to pass all the exams immediately after the completion of each modulus.

*Full-time students* are obliged to obtain their academic degree of a doctor of technical sciences in 4 years and *part-time students* in 7 years.

### 3.6. Consultation system and guiding through studies, methods of students' selection, obligations of *tutors*, *mentors* and doctoral candidates

When entering the studies, each student gets **A guidebook through doctoral studies**. This written material is based on the establishment of the entire quality management system at the following system levels: classes, scientific and professional research work; information-communication channel; seminars, symposiums, scientific conferences, etc.

During the studies (e.g. by enrolling the II semester), the Scientific Council of Postgraduate Studies appoints a **tutor** or **mentor** (according to students' wishes and professors' engagements). A tutor can be either a full professor or associate professor. Tutors' obligation is to direct students' work at all levels, to help them solve their dilemmas, to help them create their own modulus, to choose a proper topic of the doctoral thesis, to write it and, finally, to ensure students' *mobility* among other faculties.

The main objective of a tutor is to ensure closer relationship between professors and students, resulting in better study results, and higher efficiency in achieving knowledge.

### 3.7. List of the courses from other postgraduate doctoral and specialized study programmes a student can choose

A list of courses is composed on the basis of the agreement between the Faculty of Civil Engineering Osijek and other faculties that offer these optional courses. Apart from these enlisted courses a student can choose other courses, which are offered by University Josip Juraj Strossmayer constituents.

Table 4. *Courses from other study programmes a student can choose:*

| Faculty | Course                 | Professor         |
|---------|------------------------|-------------------|
| PFOS    | Banking and loans      | Prof. B. Marković |
| PFOS    | System of cooperatives | Prof. B. Petrač   |

|      |   |                                |
|------|---|--------------------------------|
| PFOS | Country tourism                             | Assistant Prof. Ph D J. Deže   |
| PFOS | Regional development                        | Prof. Z. Tolušić               |
| PFOS | Work organization and Production management | Prof. J. Kanisek               |
| PFOS | The fundamentals of management accountancy  | Prof. M. Karić                 |
| PFOS | Market and food marketing                   | Prof. Z. Tolušić               |
| PFOS | Farming policy                              | Prof. B. Petrač                |
| PFOS | Renewable energy sources                    | Assistant prof. D. Kralik      |
| PFOS | Farm waste management and recycling         | Prof. R. Emert                 |
| OM   | Multimedia systems                          | Assistant prof. G. Martinović  |
| OM   | WEB programming                             | Prof. M. Essert                |
| OM   | The fundamentals of artificial intelligence | Assistant prof. M. Zekić-Sušac |
| OM   | Macroeconomics                              | Prof. Đ. Borožan               |
| OM   | Analysis of firms' business activities      | Prof. N. Osmanagić-Bedenik     |
| OM   | Introduction to financial engineering       | Assistant prof. M. Benšić      |
| OM   | Business information analysis               | Assistant prof. N. Šarlija     |
| OM   | Multivariable analysis                      | Prof. R. Galić                 |
| TĐ   | Introduction to the Bible                   | Marko Tomić, Ph.D.             |
| PTF  | Processes of wastewater treatment           | Prof. T. Landeka               |
| PTF  | Energy and environment                      | Prof. B. Šeruga                |
| PTF  | Rationalisation of energy consumption       | Prof. B. Šeruga                |
| PTF  | Industrial ecology                          | Prof. Briški                   |

PFOS = Faculty of Agriculture, Osijek

OM = Department of Mathematics, Osijek

TĐ = Theological College, Đakovo

PTF = Faculty of Food Technology, Osijek.

### 3.8. List of courses that can be taught in a foreign language

All courses at the postgraduate studies can be taught in English.

### 3.9. Criteria and transfer terms of ECTS credits

Each course at these postgraduate doctoral studies can also be enrolled by students from other postgraduate studies at J. J. Strossmayer University and other universities, as well as students from specialized postgraduate studies. Students of these postgraduate studies can enroll particular courses of postgraduate studies at other civil engineering faculties in Croatia and for each passed exam they get 6 ECTS credits.

A student can choose some courses from other studies of Osijek University or other faculties in accordance with the List of courses and/or modulus. Each exam passed in this way earns as much ECTS credits as it earns at the faculty a student has originally enrolled. These credits are then added to credits of other courses. However, a student is obliged to pass all obligatory courses at university postgraduate civil engineering studies, although the total amount of ECTS credits can then be higher than 30 per one semester. Criteria and transfer terms are

regulated according to the common act of the Osijek University, that is by the contracts among faculties.

### **3.10. Studies completion and terms for doctoral theses registration**

The studies are completed after passing at least nine exams, doing scientific research and writing and defending the doctoral dissertation (180 ECTS credits).

#### *Registration procedure*

The registration by which a procedure for earning one's doctoral degree is started has to contain: a *doctoral thesis proposal, the explanation of the topic, and stating the expected scientific contribution*. The Committee for earning the doctoral degree appointed by the Faculty Council decides whether all the requirements for starting the procedure are satisfied. If the Committee finds that the registration does not contain the necessary documentation, it will ask a candidate to complete his/her registration in a defined term, which can not be longer than 30 days.

The *Faculty Council* appoints at the suggestion of the *Committee for Earning the Doctoral Degree*, the Committee for accepting the topic of a doctoral thesis which consists of at least 3 members and which within 30 days submits a report for accepting or refusing the topic of a doctoral thesis.

Based on the explained report and the proposal of the Committee for accepting the topic of a doctoral theses, the Faculty Council makes the final decision about accepting or refusing the proposed topic of a doctoral thesis, informs the candidate about the decision and appoints his/her mentor.

If the Faculty Council estimates on the bases of the Committee's report that a candidate does not satisfy the requirements for earning a doctoral degree, or that the suggested topic cannot be accepted, it will refuse his/her registration.

#### *Evaluation and defending of a doctoral thesis*

The *Faculty Council* appoints on the basis of the proposal of the *Committee for Earning a Doctoral Degree*, the Committee for evaluation of the doctoral theses consisting of at least three members. Members of the Committee for evaluation of the doctoral theses can only be persons with a scientific-teacher degree in a scientific field of the topic of a doctoral theses.

Members of the Committee for evaluation of the doctoral theses submit a report within 90 days from the receipt of the work.

Thier report contains: the outline of the work, opinion and evaluation of the work considering the applied methods, scientific content of the work, and the suggestion of the Committee.

The Committee for evaluation of the doctoral theses can suggest in its report:

- that the doctoral work is accepted and a candidate is allowed to defend his/her doctoral theses
- that the doctoral work is refused and returned to a candidate to complete or correct it
- that the doctoral work is refused

If the Faculty Council accepts the report of the Committee, in which it is stated that the doctoral work has some shortcomings which can be corrected, it will ask a candidate to correct his/her shortcomings according to the Committee's instructions and suggestions. In that case a candidate is obliged to complete his/her work within the period of 90 days. If a

candidate does not correct his work within 90 days, and there are no valid reasons for that, it will be considered that the doctoral work is refused.

If the Faculty Council concludes that the Committee's report does not offer a good basis for making a proper decision on the evaluation of the doctoral work, it may appoint some new members of the Committee, ask them to submit a new report or appoint a new committee for evaluation of the doctoral theses which will then re-examine the doctoral work and submit a new report.

After accepting the positive evaluation of the doctoral work, as a rule, the Faculty Council appoints at the same session, the Committee for defending the doctoral theses, consisting of at least three members and two substitutes, and defines the date and place for the defence of the doctoral theses. The members of the Committee for evaluation of the doctoral theses can be the members of the Committee for defending the doctoral theses. The members of the Committee for defending the doctoral theses can only be persons with scientific-teacher degrees.

If the Committee for evaluation of the doctoral theses evaluates the doctoral work negatively, the Faculty Council decides to refuse the doctoral work, stops the procedure for earning the doctoral degree, and informs the candidates about the decision. A specially explained decision on stopping the procedure for earning the doctoral degree will be sent to a candidate within 8 days. In this case a student cannot repeat the procedure for earning the doctoral degree with the same topic.

Defence of the doctoral theses is public. The date and place for the defence of the doctoral theses is determined by the Faculty Council, and the notice about the defence of the doctoral theses is posted on the bulletin. The notes about the defence of the doctoral theses are taken in the record which is then signed by all the members of the Committee and a note-taker. The decision of the Committee for defending the doctoral theses is written in the record.

The decision of the Committee can be:

- he/she defended the doctoral thesis unanimously
- he/she defended the doctoral thesis by a majority
- he/she did not defend the doctoral thesis

A candidate who did not defend the doctoral thesis has the right to register the defending of his/her doctoral thesis after 90 days, but not with the same topic. The topic of the doctoral thesis which has not been defended in the period of ten years can again be submitted to the accepting procedure.

### **3.11. Conditions under which students who have ceased the studies, or lost the right to study any study programme, can continue with the studies**

Students who have ceased their postgraduate studies of this Faculty or lost the right to study any postgraduate doctoral programme of some other civil engineering faculty, can continue with the postgraduate doctoral studies of this Faculty, under the condition of passing a supplemental exam, if study programmes differ at the time of the studies continuation.

### **3.12. Conditions under which a student is entitled to a certificate**

A student is entitled to a certificate after **passing exams from each semester**, that is, to a common certificate on becoming eligible for his doctoral degree, without writing and defending his/her doctoral dissertation as a part of life-long education.

### **3.13. Conditions and the way of earning the doctoral degree by enrolling in doctoral studies and by writing a doctoral dissertation without attending courses and passing the exams**

Persons who have become masters of technical sciences, field civil engineering, can enroll in postgraduate doctoral studies, without attending courses and passing the exams, and they can write and publicly defend their doctoral thesis, and with the consent of the Senate, earn their doctoral degrees.

Persons who have made some scientific achievements whose importance corresponds to the conditions for earning some scientific degrees ( research fellow, research associate or scientific counselor) can on the bases of the Faculty Council's decision on meeting all requirements for earning the above mentioned titles, without attending courses and passing the exams, enroll in postdoctoral studies, and write and publicly defend their doctoral work, and with the consent of the Senate, earn their doctoral degrees.

### **3.14. Maximal duration of the studies**

Studies for full-time students can, from their beginning to their finishing ( the doctoral programme ) last four and for part-time students seven years to the utmost.

## **4. STUDIES CONDITIONS**

### **4.1. Studies location**

Civil engineering faculty of Josip Juraj Strossmayer University in Osijek has at its disposal with about 4.200 m<sup>2</sup> of space on two locations and offers enough room for organizing all forms of teaching and extracurricular activities of students. Our faculty premises can be found at:

- **16a Drinska street** with 1960 m<sup>2</sup> in condominium ownership. The teaching for first year university undergraduate students and for all students of professional studies is organized on this location.

- **21 Crkvena street.** This building of cca 2200m<sup>2</sup> has been given to our Faculty by the town of Osijek to use for free for the period of 50 years. Second, third and fourth year university undergraduate, graduate and postgraduate students attend their lectures on this location.

Exept these two premises, first and second year students use the rooms at 6 Ljudevit Gaj square (cca 250m<sup>2</sup>). There they can use the library with the reading-room and informatics classroom of the University Departments of Mathematics and Physics. According to the

contract with the Civil Engineering Institute Croatia, business center Osijek, our Faculty uses for free 5 laboratories (cca 580 m<sup>2</sup>): geotechnical, chemical, roadbuilding, structural and materials. The contract is binding and signed for unlimited time after there was a split between the Institute and the Faculty. In addition, we use construction sites throughout Slavonia-Baranya region and Croatia as a basis for the teaching.

#### **4.2. Facts about the premises and equipment used for the studies, and information about research resources (research equipment and human resources)**

**The structure of faculty premises is** organized as it follows:

**1/ classroom surface** per student: present condition is **1848,15 m<sup>2</sup>** of the classroom surface which is **4,8 m<sup>2</sup>** per student. Considering the whole Faculty premises, and not only the classroom surface, every student has at his/her disposal 11,85m<sup>2</sup>. All classrooms are equipped with modern audiovisual aids (**an overhead projectors, a LCD panel, a notebook**). Also preparations are being made to equip one classroom for **distance teaching** with the help of TEMPUS-project funds.

**2/ office surface** per teacher: teachers have **610,92 m<sup>2</sup>** of the office surface at their disposal, which makes **11,74 m<sup>2</sup>** per teacher. There are 6 loft apartments for visiting professors in the premises at Ckvena street. All teachers and co-workers have at least one modern computer in each office which enables their individual work.

**3/ library surface** (total number of items, the number of student books available to a student): the Faculty possesses a well equipped library which is open for 10 hours a day. Its surface is 59 m<sup>2</sup>, but we can also use the library and reading-room of the University Department of Mathematics with the surface of 120 m<sup>2</sup>. The library possesses **6192** items and **1916** student books available to students and **2500** items and **610** student books in the library of the University Department of Mathematics. It is equipped with the new furniture and all necessary informational aids (two computers, a laser printer and a photo-copier) and it is connected to the Internet.

**4/ the number of laboratories for teaching:** from our own funds, the funds obtained from scientific projects, and specified-purpose allocations from the Ministry of science and education, the modern laboratory equipment 3 million kunas worth, was purchased in the last 4 years. It is used to equip the laboratories at the Faculty for model and in-situ testings of constructions, for testing wood and timber constructions, geomechanical laboratory for reinforced earth, dynamic laboratory for forced and environmental testings of all types of constructions (the only laboratory of that kind in Croatia that is included in the worldwide net of laboratories which use small tables for earthquake simulations), a laboratory for non-destructive testings of materials and constructions, a hydraulics laboratory and a laboratory for construction materials. The total surface of all the **laboratories** is **261,65 m<sup>2</sup>**. Except that, the Faculty can use, according to the contract with the Civil Engineering Institute Osijek, their 5 laboratories for free (cca 580 m<sup>2</sup>): geotechnical, chemical, roadbuilding, structural and materials. This is the best and most practical solution because in that way we do not have to employ our own laboratory technicians, but we engage them just occasionally as outside collaborators.



Table 5. *Room structure*

| Sorts of rooms       |                                       | Number of rooms | Surfaces of teaching rooms in:    |                                  |                             |
|----------------------|---------------------------------------|-----------------|-----------------------------------|----------------------------------|-----------------------------|
|                      |                                       |                 | Drinska 16a<br>- m <sup>2</sup> - | Crkvena 21<br>- m <sup>2</sup> - | Total<br>- m <sup>2</sup> - |
| 1.                   | Classrooms                            | 10              | 460,00                            | 333,83                           | 793,83                      |
| 2.                   | Computer praktikum-CARnet             | 2               | 51,60                             | 81,82                            | 133,42                      |
| 3.                   | Laboratories                          | 5               | 580,00*                           | 261,65                           | 841,65                      |
| 4.                   | Reading-room                          | 1               | -                                 | 21,64                            | 21,64                       |
| 5.                   | Conference room                       | 1               | -                                 | 99,08                            | 99,08                       |
| 6.                   | Teachers' offices                     | 29              | 367,92                            | 243,00                           | 610,92                      |
| 1-9                  | <b>Total</b>                          | <b>48</b>       | <b>879,50</b>                     | <b>1041,02</b>                   | <b>1848,15</b>              |
| 1.                   | Admissions office                     | 2               | -                                 | 91,42                            | 91,42                       |
| 2.                   | Secretariat                           | 2               | 25,80                             | 21,44                            | 47,24                       |
| 3.                   | Student' records office               | 2               | 25,80                             | 37,39                            | 63,19                       |
| 4.                   | Library                               | 1               | **120,00                          | 58,54                            | 178,54                      |
| 5.                   | Course materials bookshop             | 1               | 25,75                             |                                  | 25,75                       |
| 6.                   | Accounting department and cash-office | 2               |                                   | 53,17                            | 53,17                       |
| 7.                   | Archives                              | 1               | -                                 | 9,64                             | 9,64                        |
| 1-7                  | <b>Total</b>                          | <b>11</b>       | <b>77,35</b>                      | <b>271,60</b>                    | <b>348,95</b>               |
| 1                    | Restaurant                            | 3               | -                                 | 32,39                            | 32,39                       |
| 2                    | Toilstes                              | 8               | 58,2                              | 72,33                            | 130,53                      |
| 3                    | Apartmants                            | 6               | -                                 | 63,38                            | 63,38                       |
| 4                    | Hall and communications               | 2               | 889,98                            | 434,26                           | 1324,24                     |
| 5                    | Atrium                                | 1               |                                   | 250,14                           | 250,14                      |
| 1-5                  | <b>Total</b>                          | <b>20</b>       | <b>948,18</b>                     | <b>852,50</b>                    | <b>1877,94</b>              |
| <b>All together:</b> |                                       |                 | <b>2605,03</b>                    | <b>2169,99</b>                   | <b>4775,04</b>              |

\* using in Civil Engineering Institute Osijek - business center Osijek, 18 Drinska street

\*\* *using of the libray and reading-room belonging to the University Departments of Mathematics and Physics*

#### **Equipment envisaged for studies realisation:**

1/ **two modern computer classrooms** connected to CARnet with altogether 30 computers are used (cca 130 m<sup>2</sup>) in the teaching process. Besides these two classrooms, students can also use a computer classroom of the University Department of Mathematics with about 20 computers.

2/ some contemporary **teaching programmes** have been procured, as for example: drawing programmes, and a computerized designing programme ACAD, a set of NEMETSCHEK programmes (ALLPLAN, ALLPLOT AND FEAT), calculation programmes for all the types of constructions (ROBOT, TOWER,-SAP2000, -ETABS, SAFE,Die-Statik software), calculation programmes for bridges and prestressed bridges (TVG), geotechnic calculation programmes, construction management (GEOSLOPE), (PRIMAVERA, AGRA), nummerical modelling programmes (NISA/DISPLAY ,RUAUMOKO, LARZWWD, LARZWS, CANY-

98, NONLIN98, SARSAN, UCFIBER, USEE, MDSolid2,5), licenced mathematical software (MATHEMATICA, MATLAB)

#### 4.3. List of scientific and developing projects, which make the basis of the doctoral studies programme

Table 6. *A review of scientific-research projects*

| SIGN    | TOPIC AUTHOR              | TOPIC NAME  |
|---------|---------------------------|---|
| 1       | 2                         | 3   |
| 0149121 | <b>Stjepan Takač</b>      | Rheology of wood-concrete composite structures 2002-05.                                     |
| 0149165 | <b>Vladimir Sigmund</b>   | Performance based seismic design of wall structures 2002-05.                                |
| 0149180 | <b>Ksenija Čulo</b>       | Organization and Reorganization of Construction Companies 2002-05.                          |
| 0149210 | <b>Dragan Morić</b>       | Spectras of Structural Seismic Damageability 2002-05.                                       |
| 0149240 | <b>Vladimir Patrčević</b> | Alluvium Vertical Water Balance 2002-05.  |
| 0149260 | <b>Petar Brana</b>        | Choice of the structural strengthening techniques 2002-05.                                  |
| 0149155 | <b>Mensur Mulabdić</b>    | Reinforced Ground-The effectiveness of Reinforcement 2002-05.                               |
| 0149270 | <b>Barbara Medanić</b>    | Long-term Development of Civil Engineering - infrastructure, management, education 2002-05. |

##### **Project HITRA:**

Technological-research project *Innovative methods of testing brick industry products*

Investor: Ministry of science and technology of the Republic Croatia

Group of projects: TEST - HITRA

Cooperative organisation: Civil Engineering Institute Croatia – Business center Osijek

##### **Project CARDS:**

European Commission project **Life-long learning of civil engineers and preparedness to join the European Economic Area**

Investor: European union - European Commission

Group of projects: CARDS 2001

Our Faculty scientists take part in joint projects and teacher exchange with other civil engineering faculties abroad:

- Fakultet za gradbeništvo in geodezijo Univerze v Ljubljani, Republic of Slovenia
- Gradbena fakulteta Univerze v Mariboru, Republic of Slovenia
- Hochschule Bremen, Deutschland
- Građevinski fakultet Sveučilište in Mostar, Bosnia and Hercegowina;

- Monash University, Australia

Table 7. *International scientific-research projects*

|   |                         |   |   |             |
|---|-------------------------|---|---|-------------|
| 1 | <b>Vladimir Sigmund</b> | Contemporary design of r/c walls                                | Croat-Slovenian Research Project                      | 2002-2005   |
| 2 | <b>Vladimir Sigmund</b> | F-VEDD Project Enhanced and affordable structural protection    | European Colaboration project-Mobility of researchers | 2005.       |
| 3 | <b>Barbara Medanić</b>  | Sustainable long term development of international construction | Monash University-Melbourne Australia                 | 2003-05     |
| 4 | <b>Mensur Mulabdić</b>  | Reinforcement of Pavements with Steel Meshes and Geosynthetics  | COST-348 project                                      | 2002.-2005. |
| 5 | <b>Barbara Medanić</b>  | Curricula development in construction economics                 | CIB i Reading University-UK                           | 2005.       |

#### 4.4. Institutional administering of the doctoral programme

Postgraduate studies are administered by a vice-dean for science in the cooperation with professional services of the Faculty.

#### 4.5. Contractual relationships between students and organizer of doctoral studies

Every postgraduate student makes a *Studies contract* with the Faculty according to which all the mutual rights and obligations during the studies, payment method, and other important issues are arranged.

#### 4.5. Names of the professors and co-workers who will be teaching the courses at the time of studies initiation

Table 8. *Alphabetical list of teachers and their courses*

| No | FIRST AND LAST NAME OF PROFESSOR | COURSE   |
|----|----------------------------------|--|
| 1. | Prof. ROKO ANDRIČEVIĆ            | <i>ENVIRONMENTAL RISK EVALUATION AND MANAGEMENT GROUND WATER TRANSPORT PROCESSES</i> |
| 2. | Prof. BORIS ANDROIĆ              | <i>RELIABILITY ENGINEERING</i>   |

|     |                                |   |
|-----|--------------------------------|---|
| 3.  | Prof. DUBRAVKA BJEGOVIĆ        | <i>THEORY OF STRUCTURE DURABILITY</i>   |
| 4.  | Prof. OGNJEN BONACCI           | <i>ECOHYDROLOGY</i>   |
| 5.  | Prof. PETAR BRANA              | <i>OPERATIONAL RESEARCHES IN CIVIL ENGINEERING<br/>MODELLING OF CONSTRUCTION PROCESSES</i>        |
| 6.  | Prof. KSENIIJA ČULO            | <i>ECONOMIC ASPECTS OF INVESTMENTS</i>  |
| 7.  | Prof. DARKO DUJMOVIĆ           | <i>MODELLING IN STEEL STRUCTURES</i>  |
| 8.  | Prof. IVICA DŽEBA              | <i>MODELLING IN STEEL STRUCTURES</i>  |
| 9.  | Prof. DRAGUTIN GEREŠ           | <i>APPLICATION OF EXPERT SYSTEMS ON HYDROTECHNICAL ENGINEERING</i>                                |
| 10. | Assistant prof. IVICA GULJAŠ   | <i>STRUCTURAL DYNAMICS II</i>   |
| 11. | Assistant prof. TOMISLAV HENGL | <i>GIS AND SPATIAL DATA ANALYSIS</i>  |
| 12. | Assistant prof. ŽELJKO KOŠKI   | <i>TECHNOLOGY OF ENVIRONMENTAL ENGINEERING</i>  |
| 13. | Prof. ZLATKO LACKOVIĆ          | <i>SMALL AND MEDIUM ENTERPRISES MARKET STRATEGY</i>   |
| 14. | Prof. DAVOR MALUS              | <i>WASTEWATER TREATMENT METHODS</i>   |
| 15. | Assistant prof. SAŠA MARENJAK  | <i>STRUCTURE MANAGEMENT</i>   |
| 16. | Assistant prof. DAMIR MARKULAK | <i>RELIABILITY ENGINEERING<br/>MODELLING IN STEEL STRUCTURES</i>                                  |
| 17. | Prof. BARBARA MEDANIĆ          | <i>STRATEGIC MANAGEMENT</i>   |
| 18. | Prof. DRAGAN MORIĆ             | <i>SERVICEABILITY LIMIT STATE OF REINFORCED-CONCRETE STRUCTURES<br/>EARTHQUAKE ENGINEERING II</i> |
| 19. | Prof. MENSUR MULABDIĆ          | <i>SOIL DYNAMICS AND FOUNDATION ENGINEERING</i>   |
| 20. | Prof. VLADIMIR PATRČEVIĆ       | <i>SPECIAL CHAPTERS OF HYDROLOGY</i>  |
| 21. | Prof. JOSIP PETRAŠ             | <i>WATER RESOURCES SYSTEM ANALYSIS</i>  |

|     |                              |   |
|-----|------------------------------|---|
| 22. | Prof. VLADIMIR SIGMUND       | <i>MODELS OF NON-LINEAR MATERIAL AND STRUCTURE BEHAVIOUR<br/>STRUCTURAL DYNAMICS II</i> |
| 23. | Prof. VLADIMIR SKENDROVIĆ    | <i>PLANNING AND PREPARATION OF BUILDING PRODUCTION</i>                                  |
| 24. | Assistant prof. LIDIJA TADIĆ | <i>RIVER BASIN MANAGEMENT</i>   |
| 25. | Prof. STJEPAN TAKAČ          | <i>TIMBER STRUCTURES III<br/>MASONRY STRUCTURES III</i>                                 |
| 26. | Prof. NINOSLAV TRUHAR        | <i>EQUATIONS OF MATHEMATICAL PHYSICS<br/>NUMERICAL MATHEMATICS</i>                      |

#### **4.6. List of the teaching sites (teaching bases) for the realization of the studies (nastave i istraživačkog rada)**

Except our own room and laboratory capacities, the Faculty can use, according to the contract with the Civil Engineering Institute Osijek, their 5 laboratories for free (cca 580 m<sup>2</sup>): geotechnical, chemical, roadbuilding, structural and materials. The contract is binding and signed for unlimited time after there was a split between the Institute and the Faculty. In addition, we use construction sites as teaching bases throughout Slavonia-Baranya region and Croatia as a basis for the teaching.

#### **4.7. Optimal number of students who can enter the studies considering the rooms, equipment, professors and, particularly, the number of potential thesis mentors**

10–15 students can enter the studies to the utmost.

#### **4.8. Estimation of doctoral studies expenses**

Expenses of the studies programme, and students' work, without material costs of the making and realization of the experiment, are estimated to 44.500,00 kunas per year.

#### **4.10. Funding of the doctoral programme**

Doctoral programme can be financed through different foundations, funds and personal means. Depending on the way of financing, the Studies contract defines the social and health care level, occupational safety, or education in foreign scientific institutions and similarly.

#### **4.11. Quality of the doctoral programme**

- the evaluation of the quality and successfulness of the **realization of the doctoral programme**, and particularly, students' evaluation of the studies

- realization monitoring of **doctoral programme objectives** (acquiring of knowledge and skills, mastering the techniques, skills relevant for finding an employment outside the academic institutions, employment, *learning outcomes*)
- institutional mechanisms for **improving the quality** of the doctoral programme (self-evaluation procedures, polling of students, doing researches on successfulness of the programme realization, success indicators)

*Control of the quality and successfulness of the doctoral programme is based on:*

1. Gathering students' opinions by means of written polls which are then formed into the information important for improving the quality or achieving the wanted quality levels. The poll is conducted after the courses have been taken and the exams passed. So after the registration a student has to fill a poll questionnaire which makes the bases of every professor's quality evaluation and the quality evaluation of his/her course. The poll is an integral part of every dissertation registration. The poll contains a great number of parameters which are marked with the marks 0, 1 or 2. The average grade of the course and its professor, considering all the mentioned parameters, makes the bases of any further action. If a course has the average mark less than 0,5 it has to undergo some radical changes (the professor, the content, or something else, depending on the parameters), even the cancellation from the Studies. If the course is judged with the average mark which is less than 0,5-1,5, it is submitted to some analysis and changes considering the evaluated parameters. During the studies some other smaller polls are also conducted.
2. Gathering information from the professors themselves – teaching and practice reports, consultations, head studies reports about monitoring the students and similarly.

## Appendix 1. *Course data*

## 1 Course

### 1.1 General data

| Code                                 | Course title                      | Hours | Status      | Semester | ECTS |
|--------------------------------------|-----------------------------------|-------|-------------|----------|------|
| 1.05-107                             | EQUATIONS OF MATHEMATICAL PHYSICS | 2 + 2 | OPTIONAL -O | I - III  | 6,00 |
| Lecturer: Asc. Prof. NINOSLAV TRUHAR |                                   |       |             |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Equilibrium Equations. Structures in Equilibrium with finite degrees of freedom. Positive Definiteness and Minimum Principles. Structures in Equilibrium with rigid connections. Energetic approach to the equilibrium problem. Estimate of the equilibrium for the symmetric chain. Stationary flow in Electrical Networks. Heat transfer. Truss. Oscillations. Small one-dimensional oscillations. Oscillations with more degrees of freedom. Small oscillations and Eigenvalue problem (Eigenvalues and Dynamical Systems). Eigenvalue problem. Some properties of the Eigenvalue problem. Practical solving of the Eigenvalue problem. Nonstationary heat transfer. Damped oscillations.

### 1.4 Competence

The students will be able to use the basic results of the mathematical physics, which will allow them to apply numerical methods for calculation in some simple mathematical models. It will be concerned dynamical systems with one and more than one degree of freedom.

### 1.5 Obligatory sources

1. I. Aganović, K. Veselić, Uvod u analitičku mehaniku, Department of Mathematics, PMF, Zagreb, 1990.
2. G. Strang, Introduction to Applied Mathematics, Wellesley-Cambridge Press (1986).
3. I. Aganović, K. Veselić, Matematičke metode i modeli, Department of Mathematics, University J. J. J. Strossmayer in Osijek (in preparation)

### 1.6 Additional sources

1. J.W. Demmel, Applied Numerical Algebra, SIAM 1997.

### 1.7 Exam

|                   |           |              |              |
|-------------------|-----------|--------------|--------------|
| Exam:             | Oral: Yes | Written: Yes | Seminar: Yes |
| Pre/Corequisites: |           |              |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.



## 1 Course

### 1.1 General data

| Code                                 | Course title          | Hours | Status         | Semester | ECTS |
|--------------------------------------|-----------------------|-------|----------------|----------|------|
| 1.05-108                             | NUMERICAL MATHEMATICS | 2 + 2 | OPTIONAL<br>-O | I - III  | 6,00 |
| Lecturer: Asc. Prof. NINOSLAV TRUHAR |                       |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Introduction: errors. Significant digits. Errors in function evaluation. Interpolation. Spline Interpolation. Solving non-linear systems. Least square problems. Problem definition and examples. Orthogonalization and least squares. Matrix condition number and the sensitivity of square linear systems. Solving general linear systems. Triangular systems, LU-decomposition, Gaussian eliminations.

Iterative methods for solving nonlinear; linear difference equations, applications to solution of polynomial equations; differentiation and integration formulas; numerical solution of ordinary differential equations; roundoff error bounds.

Linear least square problems. Householder and Givens matrices, QR-decomposition. The eigenvalue problem. The general eigenvalue problem, properties and decompositions, symmetric eigenvalue problem, properties and decompositions. Iterative methods for eigenvalue determination.

### 1.4 Competence

The students will be introduced with the basic idea and methods of numerical analysis and numerical linear algebra which can be applied in solving of linear systems, least squares problems, eigenvalue and singular value problems. Further, through the lectures students will be introduced with the usage of dense and sparse matrices, floating point arithmetics and different matrix factorizations as well as with the corresponding algorithms for solving different problems in applications. Through the exercises the students will overcome with techniques for solving concrete problems with usage of software packages or with their own programs. The program is similar for all students.

### 1.5 Obligatory sources

1. Golub, C.F. Van Loan, Matrix Computations, Johns Hopkins Univ Pr., 3rd edition, 1996.
2. R. Scitovski, Numerička matematika, Odjel za matematiku, Sveučilište u Osijeku, Osijek, 1999.

### 1.6 Additional sources

1. J.W. Demmel, Applied Numerical Algebra, SIAM 1997.
2. G.W. Stewart, Matrix Algorithm, SIAM 1998

### 1.7 Exam

|                   |           |             |              |
|-------------------|-----------|-------------|--------------|
| Exam:             | Oral: Yes | Written: No | Seminar: Yes |
| Pre/Corequisites: |           |             |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1 Course

### 1.1 General data

| Code  | Course title            | Hours | Status         | Semester | ECTS |
|---|-------------------------|-------|----------------|----------|------|
| 2.05-221  | RELIABILITY ENGINEERING | 2 + 2 | OPTIONAL<br>-O | I - III  | 6,00 |
| Lecturer: Full Prof. BORIS ANDROIĆ, Ass. Prof. DAMIR MARKULAK |                         |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Terms and definitions in reliability engineering. The choice of the recommended levels of reliability for structures – reliability management. Reliability index  $\beta$  as measure of reliability. Target values of the reliability index  $\beta$ . Deterministic and probabilistic methods in reliability engineering. Approach for calibration of design values. Reliability and Eurocode. Basic variables for actions and material property. Stochastic modelling of the response of structures, actions and resistance. Limit state equations. Verification by the partial factor method – ultimate limit states and serviceability limit states. Structural reliability methods assisted by computers.

### 1.4 Competence

Student have to know principles on the base which are made new European regulations – eurocod.

### 1.5 Obligatory sources

1. Androić, B., Dujmović, D., Džeba, I.: Metalne konstrukcije 4, IAP, Zagreb, 2003.
2. Milčić, V., Peroš, B.: Uvod u teoriju sigurnosti konstrukcija, Građevinski fakultet Sveučilišta u Splitu, Split 2003.

### 1.6 Additional sources

1. EN1990:2002, Basis of Structural Design
2. Ditlevsen, O., Madsen, H.: Structural Reliability Methods, Wiley, 1996.
3. Schneider, J.: Introduction to Safety and Reliability of Structures, Structural Engineering Dokuments N5, IABSE, 1997

### 1.7 Exam

|   |           |             |              |
|---|-----------|-------------|--------------|
| Exam:   | Oral: Yes | Written: No | Seminar: Yes |
| Pre/Corequisites: Attendance to lectures and exercise, positive Semestral project, positive exam in Statistics and Probability. |           |             |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1 Course

### 1.1 General data

| Code   | Course title  | Hours   | Status                 | Semester       | ECTS        |
|--|---|---|------------------------|----------------|-------------|
| 2.05-222                                     | <b>THE MODELS OF NONLINEAR BEHAVIOR<br/>IN STRUCTURAL ENGINEERING</b> | <b>2 + 2</b>                                  | <b>OPTIONAL<br/>-K</b> | <b>I - III</b> | <b>6,00</b> |
| <b>Lecturer: Full Prof. VLADIMIR SIGMUND</b> |   | <b>Collaborators: Ass. Prof. IVICA GULJAŠ</b> |                        |                |             |

### 1.2 Instructional format

| Lectures   | Practical exercises | Experimental exercises | Seminar    |
|------------|---------------------|------------------------|------------|
| <b>YES</b> | <b>YES</b>          | <b>NO</b>              | <b>YES</b> |

### 1.3 Course curricula

Nonlinear behavior of materials and structures. Constitutive models of engineering materials. Design and modelling of material decay in structures. Numerical applications.  
Fundamentals of the theory of plasticity; numerical solution techniques in stress analysis of structures; limit analysis and applications to structures and two- and three-dimensional problems in soil, concrete, rock, and metal. Strength and stability of linear, plane and shell systems by material and geometric nonlinearity.

### 1.4 Competence

Gaining knowledge of material and geometric nonlinearity, advanced strength and stability problems in structural analysis. Advanced numerical solution techniques.

### 1.5 Obligatory sources

1. Mihanović, P. Marović, J. Dvornik, Nelinearni proračuni armirano betonskih konstrukcija, Društvo hrvatskih građevinskih konstruktora, Zagreb, 1993.
2. D.R.J. Owen, E. Hinton, Finite Elements in Plasticity: Theory and Practice, Pineridge Press, Swansea, 1980.
3. Z.P. Bažant, L. Cedolin, Stability of Structures, Dover Publications, Mineola, New York, 2003.
4. A. Mihanović, Stabilitnost konstrukcija, Društvo hrvatskih građevinskih konstruktora, Zagreb, 1993.

### 1.6 Additional sources

1. M.A. Crisfield, Non-linear Finite Element Analysis of Solids and Structures, Vol. 1&2: Advanced Topics, John Wiley & Sons, Chichester, 1997.
2. O.C. Zienkiewicz, R.L. Taylor, The Finite Element Method, Vol. 1&2: The Basis, 5<sup>th</sup> edition, Butterworth Heinemann, Oxford, 2000.

### 1.7 Exam

|  |           |             |              |
|--|-----------|-------------|--------------|
| Exam: yes  | Oral: yes | Written: no | Seminar: yes |
| Pre/Corequisites: Courses in engineering materials, continuum mechanics, Plates and shells |           |             |              |

### 1.8 Quality control

Written colloquia.

## 1 Course

### 1.1 General data

| Code                                     | Course title   | Hours        | Status             | Semester       | ECTS        |
|--|--|--------------|--------------------|----------------|-------------|
| 2.05-223                                 | <b>SERVICEABILITY LIMIT STATES OF REINFORCED CONCRETE STRUCTURES</b> | <b>2 + 2</b> | <b>OPTIONAL -K</b> | <b>I - III</b> | <b>6,00</b> |
| <b>Lecturer: Asc. Prof. DRAGAN MORIĆ</b> |  |              |                    |                |             |

### 1.2 Instructional format

| Lectures   | Practical exercises | Experimental exercises | Seminar    |
|------------|---------------------|------------------------|------------|
| <b>YES</b> | <b>YES</b>          | <b>NO</b>              | <b>YES</b> |

### 1.3 Course curricula

Engineering application of non-linear behaviour of reinforced concrete: Theories of forces calculation, ductility quantification and models interpreting non-linear engineering problems.

Classifications of all serviceability limit states: level of stresses, strains, deflections, cracks and fatigue.

Deflection limit state: Deflection line. Main geometric characteristic of cross section and its numeric analysis. Theoretical calculation of rotation of cross section (compression and tensile force). Relation between bending moment and rotation of cross section. Analysis of deflection increase to increase of short lasting load. Deflection increase influenced by creeping. Prefabricated composite floor structures and its deflections in function of: type of loads, minimum and maximum reinforcements, concrete class, type of reinforcement, ratio between tension and compression reinforcement and cross section dimensions. Deflection calculations according ENV 1992, ACI and PBAB.

Cracks limit state. Elastoplastic cracks theory of beam loaded by bending moment. Anisotropic cross section at the moment of crack opening. Change in rotation of beam and cracks dispositions. Cumulative cracks width across beam. Disposition of cracks as the result of mechanical characteristics of concrete and reinforcement. Examples of calculations and width cracks according ENV 1992, ACI and PBAB.

### 1.4 Competence

The knowledge of the ultimate serviceability and limit states of r/c structures.

### 1.5 Obligatory sources

1. Tomičić, Betonske konstrukcije, DHGK, Zagreb, 1996.
2. Tomičić, Betonske konstrukcije, Odabrana poglavlja, I. Tomičić, Zagreb, 1996.
3. A. Mihanović, P. Marović, J. Dvornik, Nelinearni proračuni armiranobetonskih konstrukcija, DHGK, Zagreb, 1993.

### 1.6 Additional sources

1. Symposium Proceedings: Flexural Mechanics of Reinforced Concrete, Ann Arbor, Michigan-USA, London-England, 1996.
2. S.Y. Noh, W.B. Kratzig, K. Meskouris, Numerical simulation of serviceability, damage evolution and failure of reinforced shells, Computers and Structures, 81 (2003) 843 – 857
3. H.G. Kwak, S.P. Kim, Nonlinear analysis of RC beams based on moment-curvature relation, Computers and Structures 80 (2002) 615-628.
4. M.E. Marante, J. Florez-Lopez, Model of damage for RC elements subjected to biaxial bending, Engineering Structures 24 (2002), 1141 – 1152

### 1.7 Exam

|   |           |             |              |
|---|-----------|-------------|--------------|
| Exam:   | Oral: YES | Written: NO | Seminar: YES |
| Pre/Corequisites: Reinforce concrete I and II |           |             |              |

### 1.8 Quality control

Two seminar papers during course lecture

## 1 Course

### 1.1 General data

| Code                              | Course title              | Hours   | Status         | Semester | ECTS |
|-----------------------------------|---------------------------|---|----------------|----------|------|
| 2.05-224                          | EARTHQUAKE ENGINEERING II | 2 + 2   | OPTIONAL<br>-K | I - III  | 6,00 |
| Lecturer: Asc. Prof. DRAGAN MORIĆ |                           | Collaborators: Full Prof. VLADIMIR SIGMUND<br>Ass. Prof. IVICA GULJAŠ |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Analysis of various types of structures exposed to dynamic earthquake ground motion.  
Methods of numeric analysis: Spectrum analysis, direct time history analysis, bearing capacity method, push-pull analysis, demand capacity analysis  
Ductility, resistance, stiffnesses, displacements, damage and earthquake risk.  
Structural response in earthquake motions and during experimental simulations: vibrations of ground, random vibrations, impuls dynamic load, shaking tables, dynamic testing.  
Prototype and models testing  
Seismic resistance of complex RC, masonry and steel buildings and engineering structures: bridges, towers, chimnies, pipelines.  
Aseismic isolation systems. Dampers and apsorbers of energy.  
Modern reaearch in earthquake engineering

### 1.4 Competence

Student have to know complex questions of static and dynamic constructions, something about materials and conglomerates behavior during the post elastic deformations, analysis of the marginally states.

### 1.5 Obligatory sources

1. Aničić, D. i dr: Zemljotresno inženjerstvo – visokogradnja, Građevinska knjiga, Beograd, 1990.
2. Paulay T. i dr., Erdbebenbemessung von Stahlbetonhochbauten, Birkhäuser, Basel, 1990
3. Tomažević, M., Earthquake-Resistant Design of Masonry Buildings, Imperial College Press, London, 1999.

### 1.6 Additional sources

1. Mihanović, A., Dinamika konstrukcija, Građevinski fakultet, Split, 1995.
2. Chopra, A.K., Dynamics of Structures, 2nd edition, Prentice Hall, Upper Saddle River, NJ, USA, 2001
3. Zbornici radova europskih i svjetskih konferencija o potresnom inženjerstvu u razdoblju 1994-2004

### 1.7 Exam

|  |           |              |              |
|--|-----------|--------------|--------------|
| Exam:  | Oral: YES | Written: YES | Seminar: YES |
| Pre/Corequisites: Dynamic of structures and Earthquake engineering I |           |              |              |

### 1.8 Quality control

Two seminar papers during course lecture

## 1 Course

### 1.1 General data

| Code   | Course title                 | Hours | Status         | Semester | ECTS |
|--|------------------------------|-------|----------------|----------|------|
| 2.05-225   | ADVANCED STRUCTURAL DYNAMICS | 2 + 2 | OPTIONAL<br>-K | I - III  | 6,00 |
| Lecturer: Ass. Prof. IVICA GULJAŠ<br>Full Prof. VLADIMIR SIGMUND |                              |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | YES                    | YES     |

### 1.3 Course curricula

Dynamic response of structural members and framework; free and forced vibrations; transverse vibrations of plates and shells. Approximate and numerical methods. Analytical model generation: FEM techniques, model reduction techniques, eigensolution techniques.  
Analytical / experimental modal analysis, multiple input/output concepts, advanced parameter estimation. Modal vector scaling and correlation techniques, orthogonality check.  
Analytical model improvement, localization of model changes.  
Non-linear response techniques: time and frequency methods, physical and modal models, analytical and experimental models. Force approximation techniques.

### 1.4 Competence

Improved techniques for system modeling have become an important part of the product development cycle for designing cost effective structures. By accepting them, students become an active link in their meaningful application.

### 1.5 Obligatory sources

1. Paz, M.: Structural Dynamics, Theory and Computation, Van Nostrand Reinhold, New York, USA, 1980.
2. Cheung, Y.K.; Leung, A.Y.T.: Finite Element Methods in Dynamics, Kluwer Academic Publishers, London, UK, 1992.
3. Mihanović, A.: Dinamika konstrukcija, Građevinski fakultet Sveučilišta u Splitu, Split, 1995.

### 1.6 Additional sources

1. Chopra, A.K.: Dynamics of Structures, Theory and Applications to Earthquake Engineering, Prentice Hall, New Jersey, USA, 2001.
2. Tedesco, J.W; McDougal, W.G; Ross, C.A.: Structural Dynamics, Theory and Applications, Addison-Wesley Longman, California, USA, 1999.

### 1.7 Exam

|   |           |             |              |
|---|-----------|-------------|--------------|
| Exam:                                   | Oral: YES | Written: NO | Seminar: YES |
| Pre/Corequisites: Structural Dynamics I |           |             |              |

### 1.8 Quality control

Assessment of knowledge is carried out in the semester, during the process of teaching, practical work and seminars.

## 1 Course

### 1.1 General data

| Code                               | Course title           | Hours | Status         | Semester | ECTS |
|------------------------------------|------------------------|-------|----------------|----------|------|
| 2.05-226                           | MASONRY STRUCTURES III | 2 + 2 | OPTIONAL<br>-K | I - III  | 6,00 |
| Lecturer: Full Prof. STJEPAN TAKAČ |                        |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | YES                    | YES     |

### 1.3 Course curricula

Resume of the scientific researches on masonry structures. Contemporary methods of calculations, forming and construction of masonry buildings. Stiffenings and total stability of masonry structures. Innovative wall elements and mortars. Prefabricated masonry structures. Detrimental deformations on masonry structures. Laboratory and in-situ testings of masonry structures

### 1.4 Competence

To understand basic elements of the masonry structures, to inform students about the main topics of the masonry structures (students' technical skills).

### 1.5 Obligatory sources

1. Mann, W.: Zug und Biezugfestigkeit von Mauerwerk – theoretische Grundlagen und Vergleich mit Versuchsergebnissen, Mauerwerkskalender 1992, Berlin, Ernst & Sohn.
2. Stockl, S.; Hofmann, P.; Mainz, J.: Methoden Für Haftversuche, Mauerwerkskalender 1990, Berlin, Ernst & Sohn.
3. Al Bosta, S.: Risse im Mauerwerk – Verformungsverhalten von Mauerwerksenden infolge Temperatur und Schwinden: 2 Auflage. Dusseldorf; Werner Verlag 199.

### 1.6 Additional sources

1. Schubert, P. und Friede, H.: Spaltzugfestigkeit von Mauersteinen, Bautechnik 1980.
2. Institut für Ziegelforschung, Essen: Verformungsverhalten und Tragfähigkeit von Mauerwerk mit Leichtmauermörtel, Forschungsschluß, 1983.
3. Kirtschig, K. und Matje, W.-R.: Leichtzuschläge für Mauermörtel. Institut für Baustoffkunde und Materialprüfung der Universität Hannover. Forschungsbericht 1983
4. Schubert, P., Beer, I.: Mauerwerk aus Porenbeton Plansteinen und Dunbettmörtel - Auswertung von Druckfestigkeitsversuchen. Aachen: Institut für Bauforschung, 2003.

### 1.7 Exam

|                   |       |          |              |
|-------------------|-------|----------|--------------|
| Exam:             | Oral: | Written: | Seminar: yes |
| Pre/Corequisites: |       |          |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1 Course

### 1.1 General data

| Code                               | Course title          | Hours | Status         | Semester | ECTS |
|------------------------------------|-----------------------|-------|----------------|----------|------|
| 2.05-227                           | TIMBER STRUCTURES III | 2 + 2 | OPTIONAL<br>-K | I - III  | 6,00 |
| Lecturer: Full Prof. STJEPAN TAKAČ |                       |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | YES                    | YES     |

### 1.3 Course curricula

Scientific-research work (scientific field: timber structures). Special research chapters on wood as a building material. Timber anisotropy influence on torsional stress and deformation of rectangular profiles. Failure hypothesis of orthotropic materials. Transverse timber strength in the volume function of loaded elements. Sorptional behaviour of wood under different microclimatic conditions. Climatic influences on timber structures.

### 1.4 Competence

To gain a basic understanding of wood characteristics and properties and timber structures in general.

### 1.5 Obligatory sources

1. Holzbauwerke-Bemessung und Baustoffe STEP1, 2, 3 nach EUROCODE 5. Informationdienst Holz, 1995 Fachverlag Holz, Düsseldorf
2. Ehlbeck, J., Kürth, J.: Einfluß des querzugbeanspruchten Volumens auf die Tragfähigkeit gekrümmter Träger konstanter Höhe und gekrümmter Satteldachträger aus Brettschichtholz. Forschungsbericht der Versuchsanstalt für Stahl, Holz, Steine, Abt. Ingenieurholzbau, Universität Karlsruhe (TH). 1990.

### 1.6 Additional sources

1. CIB W80/RILEM 71-PSL: Prediction of service life of building materials and components. CIB-publication 96. 1987.
2. Martensson, A., Thelandersson, S.: Control of deflections in timber structures with reference to EUROCODE 5. Proc. of the CIB W18 Meeting, Åhus; Schweden, Paper 25-102-2. 1992.
3. Larsen, H. J., Gustafsson, P. J., Traberg, S.: Glass fibre reinforcement perpendicular to grain. In: Proc. of the Pacific Timber Eng. Conf. Australien. 1994.

### 1.7 Exam

|                   |       |          |              |
|-------------------|-------|----------|--------------|
| Exam:             | Oral: | Written: | Seminar: yes |
| Pre/Corequisites: |       |          |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.



## 1 Course

### 1.1 General data

| Code                                 | Course title  | Hours                                    | Status                 | Semester       | ECTS        |
|--------------------------------------|---|--|------------------------|----------------|-------------|
| 2.05-228                             | <b>SOIL DYNAMICS AND<br/>FOUNDATION ENGINEERING</b> | <b>2 + 2</b>                             | <b>OPTIONAL<br/>-K</b> | <b>I - III</b> | <b>6,00</b> |
| Lecturer: Asc. Prof. MENSUR MULABDIĆ |   | Collaborators: Prof. NENAD GUCUNSKI, USA |                        |                |             |

### 1.2 Instructional format

| Lectures   | Practical exercises | Experimental exercises | Seminar    |
|------------|---------------------|------------------------|------------|
| <b>YES</b> | <b>YES</b>          | <b>NO</b>              | <b>YES</b> |

### 1.3 Course curricula

Types of actions from dynamic loads (earthquakes, traffic, engines, waves, explosions)- Soil behaviour under dynamic loads , important parameters from soil and loading side – Seismicity and earthquakes, - Soil movement – Seismic hazard – Wave propagation through soil – Determination of relevant soil properties in laboratory and in situ – Analysis of soil response – Effects of the location – Seismic slope stability – Seismic design of supporting walls – Foundation vibrations – Interaction soil-structures at static and dynamic loads – Modelling of soil structure response – Analyses of typical foundation cases

### 1.4 Competence

To gain a basic knowledge on soil dynamics regarding geotechnical analyses

### 1.5 Obligatory literature

1. Steven L. Kramer : Geotechnical Earthquake Engineering, Prentice Hall, New Jersey, 1966.
2. Braja Das: Principles of Soil Dynamics, PWS-Kent Series in Engineering, 1992.
3. E.Nonveiller: Mehanika tla i temeljenje, Školska knjiga , Zagreb, 1982.;
4. A.Szavits-Nossan : Pojave u tlu izazvane potresom, Seminar DIT: Dinamika tla, 1988.)

### 1.6 Additional literature

1. Kenji Ishihara: Soil behaviour in Earthquake geotechnics, Oxford Science Publications, 1996

### 1.7 Exam

|  |           |             |              |
|--|-----------|-------------|--------------|
| Exam:  | Oral: Yes | Written: No | Seminar: Yes |
| Pre/Corequisites: soil mechanics, geotechnical engineering |           |             |              |

### 1.8 Quality control

Working examples, seminars

## 1 Course

### 1.1 General data

| Code   | Course title                  | Hours | Status         | Semester | ECTS |
|--|-------------------------------|-------|----------------|----------|------|
| 2.05-229   | MODELLING OF STEEL STRUCTURES | 2 + 2 | OPTIONAL<br>-K | I - III  | 6,00 |
| Lecturer: Asc. Prof. DARKO DUJMOVIĆ<br>Asc.Prof. IVICA DŽEBA |                               |       |                |          |      |
| Collaborators Ass. Prof. DAMIR MARKULAK                      |                               |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Basic principles of modelling structures for design procedures. Principles of limit state design – design philosophies for steel structures, elastic theory, rigid plastic analysis, elasto-plastic analysis. Frame idealisation and basic concepts of structural analysis, methods of global frame analysis – first and second order analysis. Frame classification-braced/unbraced and sway/non-sway frames. Guidelines for elastic global analysis and plastic global analysis – choice between elastic and plastic methods of analysis. Joint representation for frame analysis – traditional approach, the semi-rigid approach. Classification of joints according to stiffness and strength. Choice of joint model for analysis. Introduction to the component method for evaluation of the initial stiffness and design moment resistance of the joint. Beam-to-column joints – welded and bolted connections.

### 1.4 Competence

Student must adopt knowledge for effective using of the computers and appropriate professional software for design and calculation of the steel structures. Already known basic principles of modeling of steel structures in this course will be extended to more details and specific topics. This way student can be actively and more effectively involved in using modeling techniques for design in the field of steel structures.

### 1.5 Obligatory sources

1. Androić, B., Dujmović, D., Džeba, I.: Modeliranje konstrukcija prema Eurocode 3, IAP, Zagreb, 2004.
2. Androić, B., Dujmović, D., Džeba, I.: Metalne konstrukcije 3, IAP, Zagreb, 1998.
3. Markulak, D.: Čelične konstrukcije, dio II, Interna skripta, GF Osijek, Osijek 2004.

### 1.6 Additional sources

1. EN1993-1-1 (EC3): Design of steel structures, General rules and rules for buildings
2. Petersen, C: Stahlbau, Wieweg and Sohn, Wiesbaden, 1994

### 1.7 Exam

|   |           |              |              |
|---|-----------|--------------|--------------|
| Exam:   | Oral: Yes | Written: Yes | Seminar: Yes |
| Pre/Corequisites: Attendance to lectures and exercise, positive Semestral project, positive exam in Steel Construction I and Steel Construction II. |           |              |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1 Course

### 1.1 General data

| Code                                   | Course title             | Hours | Status         | Semester | ECTS |
|--|--------------------------|-------|----------------|----------|------|
| 2.05-230                               | DURABILITY OF STRUCTURES | 2 + 2 | OPTIONAL<br>-K | I - III  | 6,00 |
| Lecturer: Full Prof. DUBRAVKA BJEGOVIĆ |                          |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Durability is one of the most important considerations in the design of new structures and when assessing the condition of existing structures. Although all constructive materials are likely to deteriorate to some extent, ensuring good durability is about minimizing the rate of deterioration. An understanding of durability is fundamental to establishing the service life of new or existing structures.

Knowledge of the durability potential is key to the long-term performance evaluation and should include: 1) severe environment influences on construction deterioration: extreme temperatures, fire, humidity, chemical and electrochemical loads, biological and random mechanical loads, 2) material structure and characteristics correlation, 3) transfer mechanism, 4) corrosion mechanism, 5) deficiency influences on materials and constructions, 6) numeric modeling of reinforced concrete corrosion resistance, 7) numeric modeling of fire resistance, 8) various protection approaches according to the construction material type, 9) renovations.

### 1.4 Competence

Knowledge improvement in the field of construction design in order to minimize the rate of deterioration. The basic goal is to reduce damages of the buildings and to improve overall economy by adequate protection measures.

### 1.5 Obligatory sources

1. Ivan Esih, Zvonimir Dugi: Tehnologija zaštite od korozije, Školska knjiga, Zagreb, 1990.

### 1.6 Additional sources

1. Roberge R. Pierre: Handbook of Corrosion Engineering, McGraw Hill Books, New York, 1999.
2. Ulf Nürnberger, Korrosion und Korrosionsschutz im Bauwesen, Band 1 und 2, Bauferlag GmbH, Wiesbaden und Berlin, 1995.
3. D.K. Doran: Construction materials Reference Book, Butterworth-Heinemann Ltd, Oxford, 1995.
4. Lyall Addleson, Colin Rice: Performance of Materials in Buildings, Butterworth-Heinemann Ltd, Oxford, 1995.
5. J. Crank: The Mathematics of Diffusion, Brunel University, Axbridge, Clarendon Press, Oxford, 1986.
6. S. N. Alekseev, F.M. Ivanov, S. Modry, P. Schiessel: Durability of Reinforced Concrete in Aggressive Media, A.A. Balkema-Rotterdam-Brookfield, USA, 1993.
7. H. Gräfen, A. Rahmel: Korrosion verstehen – Korrosionsschäden vermeiden, Band 1 und 2, Verlag Irene Kuron, Bonn, 1994.
8. Walter F. Cammerer: Wärme und Kälteschutz im Bauwesen und in der Industrie, Springer, Berlin, 1995.

### 1.7 Exam

|  |           |            |              |
|--|-----------|------------|--------------|
| Exam:  | Oral: Yes | Written: - | Seminar: Yes |
| Pre/Corequisites: course presence, seminar paper |           |            |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1 Course

### 1.1 General data

| Code                              | Course title                    | Hours | Status           | Semester | ECTS |
|-----------------------------------|---------------------------------|-------|------------------|----------|------|
| 5.01-105                          | ECONOMIC ASPECTS OF INVESTMENTS | 2 + 2 | OPTIONAL<br>-OTM | I - III  | 6,00 |
| Lecturer: Asc. Prof. KSENIJA ČULO |                                 |       |                  |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Longterm and shortterm assets, total capital (amortization, revalorization, average value of capital assets, accounting total capital) Indicators of economic observatin production process (productivity, rentability, economical quality, likvidity, indicators comparing). Financing economic projects (resources, structure, dynamics, guarantees). Project financing infrastructural projects (concesions, BOT). Limit of rentability. Cost and income functions. (clasic and linear cost function, creating market price, income linear function ). Costs project - assessment and planning. Financial result function. Analysis an methods evaluation in financial management.

Costs and benefits (CBA). Statical and dinamical methods. Refund method. Netto present value method. Expected present value method. Internal rentability method. Oneperid investment account. Comparison costs method. Comparison gain method. Comparison rentability method. Comparison refund period method. Control of the project through control of the costs (S-curve and other methods). Financial risks. Idea and kinds of risks. Kvantitative and kvalitative methods for analyzing risk. Managing risk.

### 1.4 Competence

Student have to know how he would make a decisions in the investments by minimize risk. He have to know choose optimal decision. He must understand rules of the cost-benefit analysis.

### 1.5 Obligatory sources

1. Ribarović, Z.: Ekonomske osnove i jednoperiodični investicijski računi, Sveučilište u Splitu, 2003.
2. Medanić, B., Skendrović, V., Pšunder, I.: Neki aspekti financiranja i financijskog odlučivanja u građevinarstvu, Osijek-Maribor, 2005.
3. Financijske tablice.

### 1.6 Additional sources

1. Manual for Preparation of Industrial Feasibility Studies, UNIDO, Vienna, 1991
2. Samuelson, P.A., Nordhaus, W.D.: Ekonomija, Mate, Zagreb, 2000
3. Van Horne, J.C., Wachowicz, J.M.Jr.: Osnove financijskog menedžmenta, Mate, 2002
4. Žaja, M.: Investicijska politika, FGZ, Zagreb, 1990
5. Žaja, M.: Ekonomika proizvodnje, Školska knjiga, Zagreb, 1991.

### 1.7 Exam

|  |                          |              |
|--|--------------------------|--------------|
| Exam:  | Oral: Yes    Written: No | Seminar: Yes |
| Pre/Corequisites: course presence, seminar paper |                          |              |

### 1.8 Quality control

During seminars, students are obliged to complete seminar paper. The final result will be dependent of paper quality and knowledge on exam.

## 1 Course

### 1.1 General data

| Code                               | Course title        | Hours | Status           | Semester | ECTS |
|------------------------------------|---------------------|-------|------------------|----------|------|
| 5.01-109                           | FACILITY MANAGEMENT | 2 + 2 | OPTIONAL<br>-OTM | I - III  | 6,00 |
| Lecturer: Ass. Prof. SAŠA MARENJAK |                     |       |                  |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | NO      |

### 1.3 Course curricula

Basic principles of facilities management theory and practices.  
The role of facility manager  
Facilities operation, maintenance and asset management  
Design for facilities management  
Facilities management finance and cost optimizations  
Risk and facilities management  
Modern methods and techniques for facilities management (FMEA, RCM, ILS)

### 1.4 Competence

The objective of the course is to equip the students with the importance of facility management in today's business environment, as well as importance of design, construction, maintenance and operation of constructed facilities, in integration. The aim is to achieve an integrated understanding of the knowledge and operational skills required for the good management of buildings, their environment and support services.

### 1.5 Obligatory sources

1. CIRIA, Facilities management manuals – a best practice guide, London, 2002.

### 1.6 Additional sources

1. Spedding A. CIOB Handbook of Facilities Management, Longman Scientific & Technical, 1994
2. Williams B., Facilities Economics, Building Economics Bureau, 2002.

### 1.7 Exam

|                   |       |              |          |
|-------------------|-------|--------------|----------|
| Exam:             | Oral: | Written: yes | Seminar: |
| Pre/Corequisites: |       |              |          |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1 Course

### 1.1 General data

| Code                                     | Course title          | Hours | Status           | Semester | ECTS |
|--|-----------------------|-------|------------------|----------|------|
| 5.01-110                                 | CONSTRUCTION PLANNING | 2 + 2 | OPTIONAL<br>-OTM | I - III  | 6,00 |
| Lecturer: Asc. Prof. VLADIMIR SKENDROVIĆ |                       |       |                  |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Organization and technology, production process, building methods. Time, cost, space. Rationalization, efficiency, productivity.  
Construction planning. Site layout. Industrialized construction, prefabricated buildings, erection. Transport and logistics management.  
Time scheduling, kinds of scheduling, planning hierarchy,. Planning technics. Monitoring and control. Software packages., Primavera, MS Project. Planning of long buildings. Line of balance. Resource planning.  
Pace and chain planning.  
Cost planning and control. S-curve and earned value.  
Work breakdown structure. Organizational structure, project and matrix structure. Formal and informal organization.  
Construction management, motivation. Conflict solving. Team work.  
Information systems. Documentation. Contract management.

### 1.4 Competence

Student have to know principles and practice of the construction modern organization, he must clearly understand: site functioning and he can managing preparation like the complex system completed of people and technical devices.

### 1.5 Obligatory sources

1. R. Lončarić: Organizacija izvedbe građevinskih projekata, Hrvatsko društvo građevinskih inženjera, Zagreb 1995,

### 1.6 Additional sources

1. J.Klepac: Organizacija građenja, skripta, FGZ, Zagreb 1984.

### 1.7 Exam

|                   |       |          |          |
|-------------------|-------|----------|----------|
| Exam:             | Oral: | Written: | Seminar: |
| Pre/Corequisites: |       |          |          |

### 1.8 Quality control

Seminar is good quality control of students, and also, the way to get aim in students researching subjects of this course.

## 1 Course

### 1.1 General data

| Code                             | Course title        | Hours | Status           | Semester | ECTS |
|----------------------------------|---------------------|-------|------------------|----------|------|
| 5.01-111                         | OPERATIONS RESEARCH | 2 + 2 | OPTIONAL<br>-OTM | I - III  | 6,00 |
| Lecturer: Asc. Prof. PETAR BRANA |                     |       |                  |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | NO      |

### 1.3 Course curricula

Definition and the goal of operations research (OR) with an emphasis on construction.  
Theory principles and connections with other scientific disciplines (system theory, system modeling, decision making theory, cybernetics).  
The principle of resolving complex production problems and decision making (the role of computers for fast quality control).  
Classification of engineering problems (discrete and ongoing, determined and stochastic, linear and non-linear, static and dynamic, exact and heuristic).  
Safe decision making (linear and dynamic programming).  
Risky decision making (safe events, probable events, conditions of probability, models of calculating probability).  
The theory of queuing lines (definitions: channel, time of serving, time of waiting, access density, serving density, open and closed serving models).  
Developing queuing models (the discipline of channel access, the discipline of waiting, various types of serving).  
Production chains as queuing problems (for example: digging, cranes, concrete pumps and mixers, transport and assembling elements).  
Algorithms for presenting transport elements, queuing and serving problems on several levels.  
Simulation as an additional decision making tool (stochastic simulation for solving waiting problems).  
Reliability of the construction system.

### 1.4 Competence

Introduce students with the possibility of quantifying the quality of construction problem solution options.

### 1.5 Obligatory sources

1. W. Jurecka, H. J. Zimmermann, Operations Research im Bauwesen, Springer Verlag, Heidelberg, 1984.
2. J. Bronson, Operations Research, J. Wiley, N. York, 1991.

### 1.6 Additional sources

1. R. Seeling, Operations Research für Bauingenieure, RWTH, Aachen, 1975.

### 1.7 Exam

|                   |           |            |              |
|-------------------|-----------|------------|--------------|
| Exam:             | Oral: Yes | Written: - | Seminar: Yes |
| Pre/Corequisites: |           |            |              |

### 1.8 Quality control

Semestral project is divided into different phases, and students need to work on project continually during semester. Attendance to lectures and exercise will be also monitoring.

## 1. COURSE

### 1.1 General data

| Code                               | Course title                    | Hours | Status         | Semester | ECTS |
|------------------------------------|---------------------------------|-------|----------------|----------|------|
| 5.01-113                           | CONSTRUCTION PROCESS SIMULATION | 2 + 2 | CHOICE<br>-OTM | I - III  | 6,00 |
| Lecturerk: Prof.dr.sc. PETAR BRANA |                                 |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NE                     | YES     |

### 1.3 Course curricula

Organizational principles of the technological construction processes  
Construction systems and their structure  
Construction systems simulation (goals, task definition, variant solutions, data collection for variants development, choice of solution and control).  
Principles of the working place creation and their process, workflow between working places  
Construction site modeling as condition for construction process simulation  
Work time structure: working and non-working  
Time recording (chronometer and instant observation)  
Statistical analysis of time recording  
Construction process simulation as serving systems  
Stochastic simulation of the working times  
Interdependence of the technological construction components  
Stochastic simulation of construction process  
Simulation of the critical activities duration (examples and discussion with reference to PERT)  
Possibilities of optimizing construction processes and technologies in relation to costs and duration

### 1.4 Competence

Introduce students through lectures and independent modeling with the possibilities of quantitative assessment of the effects that certain technological and organizational decisions could make

### 1.5 Obligatory sources

- 1.Halpin, D., woodhead, R.: *Design of Construction and Process Operations*, J. Wiley, N. York, 1996.
- 2.Kohlas, J.: *Stochastische Methoden des O. R.*, Teubner, Stuttgart, 1998.
- 3.REFA in der Baupraxis, ZTV, Frankfurt/M, 1984.

### 1.6 Additional sources

- 1.Frey, S.: *Plant Layout*, C. Hanser, Muenchen, 1995.
- 2.Gordon, G.: *Systemsimulation*, Prentice Hall, New Jersey, 1992.

### 1.7 Exam

|                 |           |            |              |
|-----------------|-----------|------------|--------------|
| Exam:           | Oral: Yes | Written: - | Seminar: Yes |
| Pre-requisites: |           |            |              |

### 1.8 Quality control

Seminar works and direct teacher-student cooperation.



## 1 Course

### 1.1 General data

| Code  | Course title                              | Hours        | Status                   | Semester       | ECTS        |
|---|---|--------------|--------------------------|----------------|-------------|
| <b>5.01-106</b>                             | MANAGEMENT OF SMALL AND MEDIUM SIZE FIRMS | <b>2 + 2</b> | <b>OPTIONAL<br/>-OTM</b> | <b>I - III</b> | <b>6,00</b> |
| <b>Lecturer: Asc. Prof. ZLATKO LACKOVIĆ</b> |   |              |                          |                |             |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Introduction in small and medium firms. Strategic management. Operativ management. Management of human resources. Electronical management. Business planning.  
Seminar works: Strategic planning, Business strategy, Control of effect of business, strategy, Marketing management, Financial planning, Different forms of organizations Quality management, Supply management, Logistic management, Planning and progress of working force, Team work, Basic elements of electronic business and Business planning for small and medium firms in Civil engineering.

### 1.4 Competence

Student have to know specific quality of the small and medium construction firms.

### 1.5 Obligatory sources

1. Mugler, J., Betriebswirtschaftslehre der Klei- und Mittelbetriebe, Springer-Verlag, Wien, 1995.
2. Mugler, J., Das Unternehmen im Leibniscyklus, Servicebetriebe der OH-WU, Wien, 1996.
3. Mugler, J., Neubauer, H., Unternehmensgründung, Service Fachverlag, Wien,
4. Siropolis, N.C., Menadžment malog poduzeća, prijevod, Mate, Zagreb, 1995.

### 1.6 Additional sources

2. R. Seeling, Operations Research für Bauingenieure, RWTH, Aachen, 1975.

### 1.7 Exam

|   |           |            |              |
|---|-----------|------------|--------------|
| Exam:   | Oral: Yes | Written: - | Seminar: Yes |
| Pre/Corequisites: Made and positively marked seminar work |           |            |              |

### 1.8 Quality control

Seminar is good quality control of students, and also, the way to get aim in students researching subjects of this course.

## 1 Course

### 1.1 General data

| Code                                 | Course title       | Hours | Status           | Semester | ECTS |
|--------------------------------------|--------------------|-------|------------------|----------|------|
| 5.01-107                             | MARKETING STRATEGY | 2 + 2 | OPTIONAL<br>-OTM | I - III  | 6,00 |
| Lecturer: Asc. Prof. ZLATKO LACKOVIĆ |                    |       |                  |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

The theory of market. Market of construction products and i services. Transparency of market. Mrket management. Functiones and division of market. Market partners, connectiones and dinamism. Instruments of supply policy and trade. Market mechanism and functioning. Effects of trade management. Strategical components and goals. Menas, actions and implementation of market strategy of construction firms. Themes of seminars: Determination of strategic goals, methods and procedure of implementation. Definition of segments. Setting of strategic plan. Analysi of marketing surrounding.

### 1.4 Competence

Student have to know concepts of longterm planning and wayes to perform emterprise marketing aims.

### 1.5 Obligatory sources

1. Karpati,T.,Transparentnost tržišta marketing etikka,HAZU,Osijek,1992.
2. Kotler, P., Upravljanje marketingom 1, Prijevod, Informator, Zagreb, 1988.
3. Marušić, M., Vranešević, T., Istraživanje tržišta, ADECO, Zagreb, 2001.
4. Marhold,K.,Bau-Marketing-Management,DVP-Verlag,Wuppertal,1992

### 1.6 Additional sources

1. Medanić,B.,Management u građevinarstvu,Građevinski fakultet,Osijek,1996.
2. Rocco, F., Marketinško upravljanje, Školska knjiga, Zagreb, 2000.
3. Senečić, J., Osnove marketinga, Mikrorad, Zagreb, 2002.

### 1.7 Exam

|   |           |            |              |
|---|-----------|------------|--------------|
| Exam:   | Oral: Yes | Written: - | Seminar: Yes |
| Pre/Corequisites: Made and positively marked seminar work |           |            |              |

### 1.8 Quality control

Seminar is good quality control of students, and also, the way to get aim in students researching subjects of this course.

## 1 Course

### 1. General data

| Code                              | Course title                         | Hours | Status        | Semester | ECTS |
|-----------------------------------|--------------------------------------|-------|---------------|----------|------|
| 5.01-112                          | TEHNOLOGY OF ECOLOGICAL CONSTRUCTION | 2 + 2 | OPTIONAL -OTM | I - III  | 6,00 |
| Lecturer: Ass. Prof. ŽELJKO KOŠKI |                                      |       |               |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Introduction in ecological construction.  
History of the ecological construction.  
Architectonic-energetic and biological-ecological requirements of modern construction.  
Valorisation of thermal characteristics of existing residential buildings.  
Use of renew energy in the building construction.  
Use of solar radiation – active and passive solar design.  
Geometry of sun radiation.  
Direct gain – use of solar radiation.  
Tromb wall.  
Construction of sunspace.  
Passive solar houses.  
Improvements of existing residential buildings with the goal of rational energy use.

### 1.4 Competence

Introducing to renewable energy resources and their using in construction. Accent is on the ecological sense.

### 1.5 Obligatory sources

1. Ž. Koški : Štednja toplinske energije u obnovi stambene arhitekture Osijeka; Građevinski fakultet Sveučilišta Josipa Jurja Strossmayera u Osijeku, Osijek (1993.g.)
2. Ž. Koški : Model slavonske obiteljske prigradske kuće utemeljen na analizi tradicijskog iskustva; doktorska disertacija (1996.g.)

### 1.6 Additional sources

1. Tabb, Phillip : Solar Energy Planning ; McGraw-Hill Book Company, New York 1984.

### 1.7 Exam

|                     |          |             |              |
|---------------------|----------|-------------|--------------|
| Exam: no            | Oral: no | Written: no | Seminar: yes |
| Pre/Corequisites: - |          |             |              |

### 1.8 Quality control

Seminar is good quality control of students, and also, the way to get aim in students researching subjects of this course.

## 1 Course

### 1.1 General data

| Code                                 | Course title           | Hours | Status           | Semester | ECTS |
|--------------------------------------|------------------------|-------|------------------|----------|------|
| 5.01-108                             | STRATEGICAL MANAGEMENT | 2 + 2 | OPTIONAL<br>-OTM | I - III  | 6,00 |
| Lecturer: Full Prof. BARBARA MEDANIĆ |                        |       |                  |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Startegy definition.  
Business strategy and it's specific qualities in construction.  
Types of the business strategy (market, personnel, production,...)  
Strategic targets in the construction business (one market, dominant product, accompanying markets, independent markets,...)  
Strategic decision making. Strategic planning.  
Implementation strategy in current management.  
Strategic managing and instruments (organization and being trained people in the organization)  
Marketing orientation in management of the global business. Specifics of the construction market and it's segmentation. Demand challenging, responsibility for demand, interaction of demand and environment.

### 1.4 Competence

Student have to know facts about environment of the modern construction business firms. He have to understand contents and limits of the strategic planning methods.

### 1.5 Obligatory sources

1. Buble i suradnici: "Strateški management", Ekonomski fakultet Split, 1998.
2. Stacey,R.D.; "Strateški management i organizacijska dinamika", "MATE" Zagreb, 1997.

### 1.6 Additional sources

1. Hillebrandt,P.; Cannon,J.; "The Modern Construction Firm", The Macmillan Press Ltd., London 1990.
2. Guiltinan, J.P.P.; Madden,G.W.; "Marketing Management-Strategies and Programs",Mc Graw-Hill Higher education, 1996.
3. Collins,E.G.C.; "Izazovi managementa u 21. stoljeću", izdanje MATE- Zagreb, 2002.

### 1.7 Exam

|  |           |             |              |
|--|-----------|-------------|--------------|
| Exam:  | Oral: Yes | Written: No | Seminar: Yes |
| Pre/Corequisites: passed exam Engineering Economy and Total Quality Management |           |             |              |

### 1.8 Quality control

Course presence, students' activities on the course in terms of quality and presentation of the individual seminar papers, analysis students' polling results about presentation quality etc.

## 1 Course

### 1.1 General data

| Code                             | Course title                     | Hours | Status         | Semester | ECTS |
|----------------------------------|----------------------------------|-------|----------------|----------|------|
| 2.05-316                         | METHODS OF WASTE WATER TREATMENT | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Asc. Prof. DAVOR MALUS |                                  |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Waste water – origin, composition, dynamics, mechanical treatment, biological treatment, tertiary treatment, modern technologies.  
Waste water plants – planning, design, construction, maintenance  
Waste water treatment in small communities: small plants, on site treatment, alternative methods  
Storm water treatment: dynamics of appearing and flushing out of pollutants, best practice management  
State of waste water treatment in Croatia, regulations, bad sides, initiatives

### 1.4 Competence

The purpose of the course is to give the participants knowledge about technical and technological possibilities of waste water treatment with an emphasis on the systems for small communities ( 40 % of Croatian citizens live in small communities ). Besides, treatment of urban storm water and water ran off from the roads is also a very important issue.

### 1.5 Obligatory sources

1. Metcalf Eddy; Wastewater Engineering, Treatment – disposal – Reuse, McGraw-Hill, 2002.
2. Skripte predavanja

### 1.6 Additional sources

1. T.J. McGhee: Water Supply and Sewerage, McGraw-Hill, 1991.
2. S. Tedeschi; Zaštita voda, Sveučilište u Zagrebu, 1997.

### 1.7 Exam

|   |           |          |          |
|---|-----------|----------|----------|
| Exam:   | Oral: yes | Written: | Seminar: |
| Pre/Corequisites: Water supply and sewage systems |           |          |          |

### 1.8 Quality control

Individual case study.

## 1 Course

### 1.1 General data

| Code                              | Course title           | Hours | Status         | Semester | ECTS |
|-----------------------------------|------------------------|-------|----------------|----------|------|
| 2.05-317                          | RIVER BASIN MANAGEMENT | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Ass. Prof. LIDIJA TADIĆ |                        |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | NO                     | YES     |

### 1.3 Course curricula

Basin characteristics and land use  
River basin water balance  
Multipurpose usage of water  
Environmental aspects of river basin management  
Sedimentation problems  
River restoration  
Flood and drought risks  
Methods of sustainable river basin management  
River basin modeling

### 1.4 Competence

Relationship between natural river basin characteristics and possibilities of human activities and application of modern trends and knowledge in river basin management

### 1.5 Obligatory sources

1. Brebbia, C.A.(2003): River Basin Management

### 1.6 Additional sources

1. Swendsen, M.(2005): Irrigation and River Basin Management,

### 1.7 Exam

|   |           |          |              |
|---|-----------|----------|--------------|
| Exam:   | Oral: yes | Written: | Seminar: yes |
| Pre/Corequisites: Integrated water management |           |          |              |

### 1.8 Quality control

Individual case study

## 1 Course

### 1.1 General data

| Code                                 | Course title                                 | Hours | Status      | Semester | ECTS |
|--------------------------------------|--|-------|-------------|----------|------|
| 2.05-318                             | EVALUATION AND ENVIRONMENTAL RISK MANAGEMENT | 2 + 2 | OPTIONAL -H | I - III  | 6,00 |
| Lecturer: Full Prof. ROKO ANDRIČEVIĆ |  |       |             |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Definition of environmental risk. Hydrological analysis of risk. Quantification of risk and thresholds. Stochastic approach in risk analysis. Identification of hazard, physical and chemical properties. Ways of exposition to the potential pollution – sources of potential pollution, their characterisation, transport of pollutant in different media (soil, air, water), evaluation of uncertainty of environmental modelling. Characterisation of risk and decisions in risk management on the basis of existing laws and regulations. Introduction of social and economic aspects in the risk management.

### 1.4 Competence

Students will get knowledge of principles and methodology of environmental risk analysis and modelling of environmental risk in praxis. Besides, the purpose is getting knowledge about risk management and decision making in development of environmental infrastructure. Today it is the part of Croatian regulations and particularly in the European Directives.

### 1.5 Obligatory sources

1. National Research Council, 1983, Risk assessment: Managing the process, National Academy Press, Washington, D.C.
2. Andričević, R., Tiskani materijali za predavanja, 1999.

### 1.6 Additional sources

1. Andričević, R. And Cvetkovic, V. Evaluation of Risk from Contaminants Migrating by Groundwater, Water Resources Research, 32(3), 1996.
2. Andričević, R., Daniels, J., Jacobson, R., Radionuclide migration using travel time transport approach and its application in risk analysis, J. Of Hydrology, 163, 1994.
3. Crouch, E.A., Wilson, R., Risk/Benefit Analysis, Ballinger, Boston, MA, 1982.
4. Fishoff, B., et.al., Acceptable Risk, Cambridge University Press, New York, 1981.

### 1.7 Exam

|                                   |           |          |              |
|-----------------------------------|-----------|----------|--------------|
| Exam:                             | Oral: yes | Written: | Seminar: yes |
| Pre/Corequisites: Fluid mechanics |           |          |              |

### 1.8 Quality control

Individual case study

## 1 Course

### 1.1 General data

| Code                                    | Course title                  | Hours | Status         | Semester | ECTS |
|---|-------------------------------|-------|----------------|----------|------|
| 2.05-319                                | SPECIAL CHAPTERS OF HYDROLOGY | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Full Prof. VLADIMIR PATRČEVIĆ |                               |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Application of digital technology in the hydrological monitoring. Analyses and evaluation of reliability contemporary measuring methods in the hydrology. Use parametric hydrology as a substitute the insufficiency hydrological monitoring. Methods and uses. Analyses time series in hydrology. Use stochastic hydrology on large and small watershed. The mathematical modeling of hydrological processes. Getting to know with more famous hydrological models. Statistical processing and analysis of hydrological processes. Hydrological forecasts.

### 1.4 Competence

Scientific explaining the theoretical comprehension about basic hydrological processes, with the training of the students, that understands and uses selected hydrological models. Introduction in the research accesses to the monitoring and evaluation of reliability of hydrological parameters.

### 1.5 Obligatory sources

1. George Fleming: Computer Simulation Techniques in Hydrology, Elsevier, 1985
2. V.T.Chow, D.R. Maidment, L.W. Mays: Applied Hydrology, McGraw Hill, 1988
3. Richard H. McCuen: Hydrologic Analysis and Design, Prentice Hall, 1989

### 1.6 Additional sources

1. D. Srebrenović: Primjenjena hidrologija, Tehnička knjiga Zagreb, 1986

### 1.7 Exam

|                                     |           |          |              |
|-------------------------------------|-----------|----------|--------------|
| Exam:                               | Oral: yes | Written: | Seminar: yes |
| Pre/Corequisites: Hydrology 1 and 2 |           |          |              |

### 1.8 Quality control

Programs and partial seminary thesis



## 1 Course

### 1.1 General data

| Code                              | Course title                     | Hours | Status         | Semester | ECTS |
|-----------------------------------|----------------------------------|-------|----------------|----------|------|
| 2.05-320                          | SYSTEM ANALYSIS IN HYDROTECHNICS | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Asc. Prof. JOSIP PETRAŠ |                                  |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Basic definitions and history of system engineering in hydrotechnics. Definition and classification of hydrotechnical and water management structures. Natural and artificial systems. Characteristics of the system, direct and reflexive connections in system, processes inside the system. Adaptability of the system. Entropy. Principles of the functional and hierarchical decomposing and aggregation of the system. Gnoseologic formalisation of water management aims and exercises. Cybernetic scheme of the system. Effect of synergy. Principles of the achieving optimal management decisions. Systematisation of optimisation exercises – optimisation analysis and synthesis. Definition of aim structures, groups of restrictions and criteria for evaluation of management decisions. Review and application of operational research in water management optimisation. Simulation of system operation, mathematical simulation models. Analysis of system certainty. Application of information and information technology in water management. On line information, data bank. Environmental aspects of planning in water management.

### 1.4 Competence

Aim of the course is analytically and systematically overview all possible impacts of hydraulic engineering especially considering environment – natural resources. Importance of such attitude is resulting with more successful utilisation of water resources, its protection and protection from destructive force of water, floods and erosion. System analysis is a basis of modern approach to the theory of hydrotechnical systems with the main purpose of implementation of this knowledge during the scientific and professional work of future engineers.

### 1.5 Obligatory sources

1. Mass et al: Design of Water Resources Systems, Harvard University Press, Cambridge Ma 1970.
2. Hall, W.A., Dracup, J.A.: Water Resources Systems Engineering, Mc Graw-Hill, New York, 1970.
3. Đorđević, B.: Vodoprivredni sistemi, Naučna Knjiga, Beograd, 1990.

### 1.6 Additional sources

1. D.P. Loucks: Water Resources Systems Analysis, International Institute for Hydraulic and Environmental Engineering, Delft, Netherlands.
2. Major, C.D., Lenton, L.R.: Applied Water Resources System Planning, Prentice Hall Int. London, 1979.
- Haimes, Y.Y.: Hierarchical Analyses of Water Resources Systems, Mc Graw-Hill, New York, 1977

### 1.7 Exam

|  |           |          |              |
|--|-----------|----------|--------------|
| Exam:  | Oral: yes | Written: | Seminar: yes |
| Pre/Corequisites: courses of undergraduate study-hydrotechnical branch |           |          |              |

### 1.8 Quality control

|                       |
|-----------------------|
| Individual case study |
|-----------------------|

## 1 Course

### 1.1 General data

| Code                                 | Course title                    | Hours | Status         | Semester | ECTS |
|--------------------------------------|---------------------------------|-------|----------------|----------|------|
| 2.05-321                             | GROUNDWATER TRANSPORT PROCESSES | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Asc. Prof. ROKO ANDRIČEVIĆ |                                 |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| yes      | no                  | no                     | yes     |

### 1.3 Course curricula

Basics of earth formations with an emphasis on natural heterogeneity and anisotropy. Basic laws of flow and transport in geological formations and their mathematical description. Basics of geo-chemistry and its modelling in the practical problems. Basics of geostatics and its utilisation in description of heterogeneity of hydraulic parameters. Porosity and relation between fluid and solid parts of the earth. Darcy law hydraulic conductivity, permeability and methods of measurement and calibration of models used in underground transport modelling. Stochastic approach to description of spatial variability and parametric uncertainty in the underground transport modelling. Concept of volumetric concentration and concentration of mass flow. Analytical models in underground pollution transport and their application in the most common practical problems. Participants of the course will get a CD with basic models and have an opportunity to use them during lectures.

### 1.4 Competence

This course offers detailed review of underground transport processes based upon physical and chemical laws. Especially is stressed spatial variability of underground physical and chemical properties and their impact on final result. Understanding of basic processes are essential for the all problems of transport of any substance connected with the groundwater. Students will also have an opportunity to use unique models for solving practical environmental problems of groundwater

### 1.5 Obligatory sources

1. Andričević, R., Flow and transport in groundwater, skripta za poslijediplomsku nastavu, 1996.
2. De Marsily, G. Quantitative hydrogeology: Groundwater hydrology for engineers, Academic Press, New York, 1986.

### 1.6 Additional sources

1. Freeze, R.A., Cherry, J.C., Groundwater, Prentice Hall, New Jersey, 1979.
2. Andričević, R., Transport of sorbing solutes in randomly heterogeneous porous formations: spatial moments, macrodispersion, and parameter uncertainty, DRI Publication No. 45108 (DOE/NV/10845-24), June 1993

### 1.7 Exam

|                   |           |              |              |
|-------------------|-----------|--------------|--------------|
| Exam:             | Oral: yes | Written: yes | Seminar: yes |
| Pre/Corequisites: |           |              |              |

### 1.8 Quality control

Individual case study

## 1 Course

### 1.1 General data

| Code                                | Course title                  | Hours | Status         | Semester | ECTS |
|-------------------------------------|-------------------------------|-------|----------------|----------|------|
| 2.05-322                            | GIS AND SPATIAL DATA ANALYSIS | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Ass. Prof. TOMISLAV HENGL |                               |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | YES                 | YES                    | NO      |

### 1.3 Course curricula

Introduction to geoinformation science and remote sensing;  
Spatial data analysis – sampling, spatila autocorrelation, regression analysis, interpolation;  
Digital terrain modelling and terrain parameterisation;  
Mapping and monitoring of surface waters (satellite imagery);  
Mapping and monitoring groundwater resources (point samples);  
Integrative modelling of water resources in a GIS;

### 1.4 Competence

The purpose of the course is to introduce the students to the basic concepts of GIS tools with special focus on the spatial data analysis techniques and application of GIS in mapping and monitoring water resources. The pragmatic objective of the course is to train students to work independently in GIS packages.

### 1.5 Obligatory sources

1. Hengl T., 2004. Geoinformacijski sustavi u inventarizaciji prirodnih resursa. Sveučilište u Osijeku, Osijek, 350 str.

### 1.6 Additional sources

1. Burrough, P.A. and McDonnell, R.A., 1998. Principles of geographical information systems. Oxford University Press, Oxford, 327 pp. ([www.oup.co.uk/best.textbooks/geography/burrough/](http://www.oup.co.uk/best.textbooks/geography/burrough/))
2. Lyon, J.G., 2003. GIS for Water Resources and Watershed Management. Taylor & Francis, London, 266 pp. ([bookshop.blackwell.com](http://bookshop.blackwell.com))

### 1.7 Exam

|                                       |           |              |             |
|---------------------------------------|-----------|--------------|-------------|
| Exam:                                 | Oral: yes | Written: yes | Seminar: no |
| Pre/Corequisites: geodesy, statistics |           |              |             |

### 1.8 Quality control

Course presence, students' activities on the course in terms of quality and presentation of the individual seminar papers, analysis students' polling results about presentation quality etc.

## 1 Course

### 1.1 General data

| Code                                | Course title | Hours | Status         | Semester | ECTS |
|-------------------------------------|--------------|-------|----------------|----------|------|
| 2.05-323                            | ECOHYDROLOGY | 2 + 2 | OPTIONAL<br>-H | I - III  | 6,00 |
| Lecturer: Full Prof. OGNJEN BONACCI |              |       |                |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | YES                    | YES     |

### 1.3 Course curricula

Relation between hydrology and ecology  
Interdisciplinary in science  
Sustainable development  
Synthesis of Newton and Darwin approach  
Definition of ecohydrology  
Environmental principles and laws  
Natural ecosystems and pressures on them  
Integrative role of water cycle  
Global climate change  
Floods, flooded and wetlands  
Drought and arid lands  
Open watercourses – connection of hydrology, ecology and biology  
Problem of ecologically acceptable discharges

### 1.4 Competence

Support to the sustainable development and environmental protection in the water resources domain and watercourses management

### 1.5 Obligatory sources

1. Bonacci O. (2003.) Ekohidrologija vodnih resursa I otvorenih vodotoka, Građevinsko arhitektonski fakultet Sveučilišta u Splitu. 486 str.

### 1.6 Additional sources

1. Eagleson PS (2002) Ecohydrology, Cambridge University Press. 441 str.

### 1.7 Exam

|                               |           |             |              |
|-------------------------------|-----------|-------------|--------------|
| Exam:                         | Oral: yes | Written: no | Seminar: yes |
| Pre/Corequisites: Hydrology 1 |           |             |              |

### 1.8 Quality control

Individual case study

## 1 Course

### 1.1 General data

| Code                                | Course title  | Hours | Status      | Semester | ECTS |
|-------------------------------------|---|-------|-------------|----------|------|
| 2.05-324                            | APPLICATION OF EXPERT SYSTEMS IN HYDROTECHNICAL ENGINEERING | 2 + 2 | OPTIONAL -H | I - III  | 6,00 |
| Lecturer: Full Prof. DRAGUTIN GERES |   |       |             |          |      |

### 1.2 Instructional format

| Lectures | Practical exercises | Experimental exercises | Seminar |
|----------|---------------------|------------------------|---------|
| YES      | NO                  | NO                     | YES     |

### 1.3 Course curricula

Artificial intelligence ( expert systems and neural network) as a tools of qualitative analysis and decision making. Cognitive processes and information processes. Expert systems and conventional programmes-synergy. Data bases and knowledge base.// Theoretical basis of expert systems ( Structure; representation of knowledge in expert systems, representation of knowledge based upon logic, representation of knowledge and object methods ( semantic network, frames and objects); Deductive and induced concluding and preparation of knowledge.// Practical aspects of expert system application.//Development of expert systems and knowledge acquisition. System analysis. Knowledge acquisition and logic design. Physical design – choice of programming languages and tools; shells of expert systems; choice and adjustment of user interfaces; Coding, testing and performance of expert systems, Implementation.// Objectively orientated representation and hybrid methods.// Uncertainty in expert systems: uncertainty in real world. Probabilistic methods. Fuzzy sets and fuzzy logic; Theory of possibilities; theory of provement.// Evaluation of expert systems.

### 1.4 Competence

Lectures cover theoretical basics and practical application of expert systems and neural network in hydrotechnics. Development of capability for recognition and solving problems of decision making and management. Creation of conditions for solving problems by system approach to the planning, development and management in hydrotechnics.

### 1.5 Obligatory sources

1. Liebowitz, J.: The Handbook of Applied Expert Systems, CRC Press. ISBN: 0849331064, 1997.;
- Grbavac, V.: Informatika - računala i primjena, Školska knjiga Zagreb, 1995

### 1.6 Additional sources

1. Mays,L.W. and Tung,Y.K.: Hydrosystems Engineering and Management. McGraw-Hill Inc. New York, 1992.;
2. Radovi iz časopisa: Decision Support Systems; Neural Networks World i sl.;
3. Srića, V.: Uvod u sistemski inženjering. Zagreb, 1988.//

### 1.7 Exam

|   |           |          |              |
|---|-----------|----------|--------------|
| Exam:   | Oral: yes | Written: | Seminar: yes |
| Pre/Corequisites: Integrated water management |           |          |              |

### 1.8 Quality control

Individual case study

## Appendix 2 *Lecturers*

## 2 Lecturer

### 2.1 General data

| Name and surname | E-mail adress  | Web page |
|------------------|--|----------|
| ROKO ANDRIČEVIĆ  | <a href="mailto:rokoand@gradst.hr">rokoand@gradst.hr</a> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>PROFESSOR</b>            | <b>1998</b>              |

### 2.3 Curriculum vitae

Graduated in 1980 on the Faculty of Civil Engineering University of Zagreb and since then employed in the Faculty of Civil Engineering University of Split working on the scientific and professional problems of hydrotechnics. Master degree got on the Faculty of Civil Engineering University of Zagreb in 1985. Doctoral studies attended on the University of Stanford and University of Minnesota in USA. Involved in the scientific and professional projects financed by National Scientific Foundation and Environmental Protection Agency.

Since 1991 until 1998 professor on the Desert Research Institute, University of Nevada, Las Vegas, working on the environmental problems of groundwater and surface water systems

Leading scientist on the project of radioactive waste management and program of radioactive protection on the «Nevada Test Site» ( used as a nuclear testing field). In 1998 came back to the Faculty of Civil Engineering University of Split. Since 2002 minister deputy in Ministry of environmental protection of Republic of Croatia. As a Principal Investigator involved in many scientific and professional regional projects.

### 2.4 Recent papers (since 2000)

Author of more than 40 scientific papers in international journals and a number of professional papers and studies in the field of environment, water resources management and energy.

### 2.5 Recent papers on course subject

1. Andričević, R., J. Daniels, and R. Jacobson: Radionuclide migration using travel time transport approach and its application in risk analysis, Journal of Hydrology, 163, 125-145, 1994.
2. Andričević, R. and V. Cvetković: Evaluation of risk from contaminants migrating by groundwater, Water Resources Research, 32(3), 611-621, 1996.
3. Andričević, R.: Evaluation of sampling in the subsurface, Water Resources Research, 32(4), 863-875, 1996.
4. Andričević, R. and V. Cvetković: Relative dispersion for solute flux in aquifers, Journal of Fluid Mechanics, Vol. 361, pp. 145-174, 1998.

### 2.6 Memberships

American Geophysical Union (since 1985), American Society of Civil Engineers (since 1990)  
International Association of Hydrological Sciences ( since 1989), American Water Resources Association (since 1991), Society of Civil Engineers of Split (since 1998 )

## 2 Lecturer

### 2.1 General data

| Name and surname         | E-mail adress | Web page |
|--------------------------|---------------|----------|
| <b>DUBRAVKA BJEGOVIĆ</b> |               |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Professor</b>            |                          |

### 2.3 Curriculum vitae

Born in 1945. in Nova Gradiska, Republic of Croatia. Education: Doctor of Technical Sciences (Ph.D.), 1991, University of Zagreb, Faculty of Civil Engineering Master of Technical Sciences, 1978, Thesis: «Corrosion and material protection», University of Zagreb, joint course of Faculty of Civil Engineering and Faculty of Mechanical Engineering Bachelor of Civil Engineering, 1968, University of Zagreb, Faculty of Civil Engineering. Senior researcher of the following scientific projects (since 1999.): a) Reinforced concrete structures protection theory and modeling, financed by the Ministry of Science, Education and Sports, RC (1999-2002); b) COST 521 – Corrosion of Steel in Reinforced Concrete Structures, jointly financed by the Ministry of Science, Education and Sports, RC and European Union (1998-2002); c) Durability of reinforced concrete Structures, Croatian and Slovenian bilateral program (2001-2003); d) Multilayer tunnel elements fire protection, TEST Program – technology projects HITRA financed by the Ministry of Science, Education and Sports, RC (2001-2003); e) Precast fire resistant segments for secondary tunnel lining, project EU – EURECA (2001-2003); f) Development of corrosion testing of civil engineering materials, cooperation of University of Zagreb, Faculty of Civil Engineering and California State University of Northridge, USA; g) Role of the alternative materials in sustainable development of cement production, Technology project financed by the Ministry of Science, Education and Sports, RC; h) TABKIMO – Reinforced concrete structures durability in the maritime environment, Ministry of Development and Reconstruction, RC; i) COST 534 Improving anchors durability using inhibitors, EU project. Computer software: Bjegović, D.; Krstić, V.; Mikulić, D.: CLODIF – computer program for chlorine ions diffusion analysis in concrete structures, 1993. Patents: - USA patent No. US 6,342,101 B1, 2002, Jan. 29.

### 2.4 Recent papers (since 2000)

1. Bjegović, Dubravka; Skazlić, Marijan; Mavar, Krunoslav: Approach to Repair Strategy of Reinforced Concrete Structure, Proceedings of Internatioanl Conference Strustural Faults + Repair, London, 2003.
2. Bjegović, Dubravka; Stipanović, Irina; Skazlić, Marijan; Ferić, Kajo; Barbalić, Ivo. Case Study- Corrosion Monitoring in Marine Environment in Croatia, Proceedings of Eurocorr 2003, The European Corrosion Congress, Budapest, 2003. paper No. 219.
3. Skazlić, Marijan; Bjegović, Dubravka; Tvrtković, Dinko: Reactive powder concrete for better earthquake resistance, Proceeding of the fib Symposium 2003 "Concrete Structures in Seismic Regions", Athens, Greece, 2003.
4. Bjegović, Dubravka; Stipanović, Irina; Skazlić, Marijan; Szavits-Nossan, Antun; Kovačević, Meho-Saša: Znanost i tehnologija:Eureka projekt E!2823 Fire-Tunnel, Zbornik savjetovanja "Nove tehnologije u hrvatskom graditeljstvu", HDGK, Brijuni 2003. pp. 59-66.
5. Bjegović D., Skazlić M., Pičulin S.: Properties of High-Performance Hybrid Fibre-Reinforced Concrete, Second International Symposium Fibre Concrete & High Performance Concrete 2003 (FC&HPC 2003), September 24-26, 2003, Frydlant n.O., Czech Republic
6. Rosković, R; Patajac, H.; Bjegović, D: Motives of descending integration in cement-industry, Proceedings of 6<sup>th</sup> Inter. Conf.: "Organisation, Tehnology and Management in Construction", Mošćenička Draga, 2003, pp. 254-261.
7. Bjegovic, Dubravka; Šelih, Jana; Mikulić, Dunja; Stipanović, Irina: Models for service life prediction, Proceedings of the 2nd International RILEM Workshop on Life Prediction, 5-6 May 2003, Paris,pp. 13-20.

### 2.5 Recent papers on course subject

Papers listed in paragraph 2.4

### 2.6 Memberships

Croatian Association of Civil Engineers, Conditions Affecting Concrete, Technical Committee for Concrete, Technical Committee for fire resistance, Croatian Academy of Technical Science, NACE International, Houston, Texas, USA, New York Academy of Sciences, New York, USA.



## 2 Lecturer

### 2.1 General data

| Name and surname      | E-mail adress                    | Web page |
|-----------------------|----------------------------------|----------|
| <b>OGNJEN BONACCI</b> | <b><u>obonacci@gradst.hr</u></b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Professor</b>            |                          |

### 2.3 Curriculum vitae

Born in 1942 in Bugojno, Bosnia and Herzegovina. Primary and secondary school finished in Zagreb. Graduated and got master and PhD degree on Faculty of Civil Engineering University of Zagreb. Since 1965-1969 employee of Sava Basin Water Management Company in Zagreb. Since 1970-1975 worked in Meteorological and hydrological Service Zagreb. Since 1976 until today employed on the Faculty of Civil Engineering University of Split lecturing in Zagreb, Mostar and Osijek as well.

Specialities are hydrology, hydrometry, karst hydrology, water management, sedimentation transport and ecohydrology.

I was leader or collaborator on the dozen of national and international scientific projects from the field of hydrology and water management and on the more than 200 professional project, some of them in Algeria, Albania and Ethiopia.

### 2.4 Recent papers (since 2000)

More than 360 papers published in Croatian, English, German, French and Russian language. Some of them were published in the leading world journals: Journal of Hydrology, Journal of Hydraulic Research, Hydrological Science Journal, Theoretical and Applied Climatology, Water Science and Technology, Wasserwirtschaft, Groundwater, Water Resources Bulletin, Hydrological Processes, Regulated Rivers, Hydrogeological Journal, etc. About 90 papers were published in the proceedings of conferences and symposia.

Books: Ekohidrologija, Sveučilište u Splitu, 2003

Oborine- glavna ulazna veličina u hidrološki ciklus, Sveučilište u Splitu 1994

Karst Hydrology, Springer Verlag, 1987

### 2.5 Recent papers on course subject

3.

1. Bonacci O (2003.) Ekohidrologija vodnih resursa i otvorenih vodotoka, Građevinsko arhitektonski fakultet Sveučilišta u Splitu. 486 str.

### 2.6 Memberships

International Association of Hydrogeologists, International Association for Hydraulic Research, International Water Resources Association, International Association of Hydrological Sciences, American Geophysical Union, International Rainwater Catchment Systems Association, American Water Resources Association, British Cave Resources Association, European Geophysical Society, New York Academy of Science

## 2 Lecturer

### 2.1 General data

| Name and surname     | E-mail adress          | Web page                  |
|----------------------|------------------------|---------------------------|
| <b>BORIS ANDROIĆ</b> | <b>androic@grad.hr</b> | <b>www.grad.hr/metali</b> |

### 2.2 Academic status

| Academic or teaching status          | Date of last appointment |
|--------------------------------------|--------------------------|
| <b>permanent full time professor</b> | <b>13.03.2001.</b>       |

### 2.3 Curriculum vitae

1944. born in Vinkovci; 1960.-1965. High school in Zagreb; 1965.-1971. . Faculty of Civil Engineering in Zagreb; 1982. M.A. degree - Faculty of Civil Engineering in Zagreb; 1986. Ph. D. degree - Faculty of Civil Engineering in Zagreb; 1972.-1976. Italian-germany office in Germany  
1976.-1991. Civil Engineering Institut - Faculty of Civil Engineering in Zagreb, Department for steel structures; Repair, expertise and design group; 1992.- Faculty of Civil Engineering in Zagreb, Department for Structures  
; 1977. assistant; 1986. assistant professor; 1992. affiliated professor; 1995. full time professor; 2001. permanent full time professor  
Awards: Mitgliedsurkunde aus Anlass IVBH 50 jaehrigen Bestehens, Zurich 1979.  
Zahvalnica, Republika Hrvatska, Ministarstvo obrane, 1996.  
L'art de l'ingenieur, Editions du Centre Pompidou, Paris 1997., priznanje  
"Fran Bošnjaković" - godišnja nagrada Sveučilišta u Zagrebu 1998.  
Godišnja nagrada Hrvatskog Saveza građevinskih inženjera, 1999.

### 2.4 Recent papers (since 2000)

1. Dujmović, Darko; Androić, Boris; Skejić, Davor: **RELIABILITY OF SHEAR DIAPHRAGM MADE OF TRAPEZOIDAL SHEETS**, 20th Czech and Slovak National Conference "Steel Structures and Bridges 2003", Czech Technical University in Prague, Prague, Czech Republic, 2003., Proceedings, pp 493-499
2. Androić, Boris; Džeba, Ivica; Dujmović, Darko: **INTERNATIONAL STRUCTURAL STEEL SECTIONS - DESIGN TABLES ACCORDING TO EC 3** Ernst & Sohn, A Wiley Company, Berlin, 2000., I. dio (6 poglavlja), II. dio (5 poglavlja), 679 str.
3. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **BEISPIELE NACH EC-3, BEMESSUNG UND KONSTRUKTION VON STAHLBAUTEN** Werner-Verlag GmbH, Düsseldorf, 2001, 5 poglavlja, 601 str.
4. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **METALNE KONSTRUKCIJE 4** IA Projektiranje d.o.o., Zagreb, 2003., 416 str.
5. Dujmović, Darko; Androić, Boris; Džeba, Ivica: **MODELIRANJE KONSTRUKCIJA PREMA EUROCODE 3** IA Projektiranje d.o.o., Zagreb, 2004., 625 str.

### 2.5 Recent papers on course subject

1. Dujmović, Darko; Androić, Boris; Skejić, Davor: **RELIABILITY OF SHEAR DIAPHRAGM MADE OF TRAPEZOIDAL SHEETS** 20th Czech and Slovak National Conference "Steel Structures and Bridges 2003", Czech Technical University in Prague, Prague, Czech Republic, 2003., Proceedings, pp 493-499
2. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **METALNE KONSTRUKCIJE 4** IA Projektiranje d.o.o., Zagreb, 2003., 416 str.
3. Markulak, Damir; Džeba, Ivica; Androić, Boris: **A PROBABILISTIC EVALUATION OF THE SAFETY LEVEL OF COMPOSITE ROAD BRIDGES** IABMAS 02, Barcelona, Spain, 2002., Proceedings
4. Puž, Goran; Androić, Boris: **PROBABILISTIČKI PRISTUP OSTVARIVANJU TRAJNOSTI MOSTOVA** IV. radni sabor, Graditelji u obnovi Hrvatske, Društvo hrvatskih građevinskih konstruktora, Brijunski otoci, 1998., Zbornik radova, str. 113-120
- Androić, Boris: 5. **SAFETY INDICES OBTAINED BY CALIBRATION OF EXISTING STEEL STRUCTURES IN CROATIA** Journal of Constructional Steel Research, Vol. 46 No. 1-3 (1998), Full paper on CD-ROM

### 2.6 Memberships

Akademy of Technical Sciences, International Association for Bridge and Structural Engineering – Fellow Member, Croatian Association of Constructors, European Convention for Constructional Steelwork - TC6

## 2 Lecturer

### 2.1 General data

| Name and surname   | E-mail adress              | Web page |
|--------------------|----------------------------|----------|
| <b>PETAR BRANA</b> | <b>pbrana@most.gfos.hr</b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Associate Professor</b>  | <b>20.05.2003.</b>       |

### 2.3 Curriculum vitae

He was born in Derventa on August 20, 1945. He completed Technical School in Novi Sad in 1965. Graduated on the construction division of the Construction faculty on Sarajevo University in 1970, subject – foundations. Postgraduate studies in organization and construction technology from 1970 – 1972, M.A. in 1981 on the Construction Faculty in Belgrade. A doctors degree in 1990 in the field of organization and construction technology. Became assistant professor in Construction systems production on the Construction faculty in Novi Sad in 1990, where he held classes in Technology of assembling, Organization and mechanization of construction and System engineering.

The Construction faculty in Zagreb confirmed his assistant degree in 1993, and he was registered in the Ministry of science and technology of Croatia as a scientific researcher under the number 202300.

He was a technical manager in "Tamin" company in Zagreb 1994 – 2000.

He was elected associate professor in the subject of construction organization for Managing construction projects and Construction technology in 2003 on the Construction faculty in Osijek. He is the head of the panel for Construction technology and postgraduate studies in Construction organization on the Construction faculty in Osijek.

### 2.4 Recent papers (since 2000)

1. Brana, P., Sigmund, V.,: Project management in Precast Concrete Construction, XIX posvetovanje organizatorjev dela v Portorožu z mednarodno udeležbo.,29-31.03.2000, page: 354-364,
2. Brana,P., Sigmund,V.,: Model for Simulating the Work of Tower Cranes First A. Caquot International Conference of Modeling and Simulation in Civil Engineering, Paris, 3-5.10.2001
3. Brana, P., Čulo, K.,: Project managing in Construction Preparation 2<sup>nd</sup> SENET Conference on Project Management, 17-19.04.2002, Cavtat, Croatia CAPM & IPMA & CIB Proceedings,
4. Brana, P., Sigmund, V.,Vidaković,D.: Rough Planning Process of the Construction Projects 2<sup>nd</sup> SENET Conference on Project Management, 17-19.04.2002, Cavtat,Croatia CAPM & IPMA & CIB Proceedings,
5. Brana, P., Čulo, K., Sigmund, V.,: Simulating Cycle Duration of Tower Cranes Operations 12th Int. Conf. on Flexible Automation and Intelligent Manufacturing, July 15-17, 2002, Dresden
6. Sigmund, D., Sigmund, V., Brana, P.,: Adoptable Building by Use of R/C Sandwich-Panels, 1st DAAAM Int. Conf. on Advanced Technologies for Developing Countries, Sept. 12-14, 2002,Slavonski Brod,
7. Brana, P., Vidaković, D., Knežiček, T.: Modelling The Concrete Transfer Process with a Tower Crane, 3<sup>rd</sup> Int. Conf. TECHSTA 2002, Prague, Oct. 16 -18, 2002,Proceed. ISBN-80-01-02629-9, page: 30 -36
8. Brana, P., Vidaković, D., Gušić, I.: Tower Cranes Selection Regarding to Construction Technolog Requirements, Mošćenička Draga, 2003.
9. Brana, P., Čačković, I.: Evaluation of Construction Technologies for Reatining Walls, 4<sup>rd</sup> International Conference TECHSTA 2004, Prague, veljača 2004.
10. Sigmund, D., Sigmund, V., Brana, P.: A Modular Coordinated Construction Process with Streaming concrete tehnology, ECRBM 04, Sarajevo, 20 -21. May 2004.

### 2.5 Recent papers on course subject

1. Brana, P.: Priprava gradbene proizvodnje "Organizacija" br. 10/1998, str.579 –590, Kranj, Letnik 31,
2. Brana, P.: Problematika prostornog rasporeda uređenja gradilišta, "Izgradnja" br. 2/1992, str.21-24
3. Brana, P.: Upravljanje gradbišča visoke gradnje kot proizvodnega sistema, Zbornik XVII.Posvetovanja organizatorjev dela v Portorožu "Challenges of management" 04.1998,str. 707-713, Radovi iz 2.4 ; 6., 7., 12., 18.

### 2.6 Memberships

CAPM - Hrvatska udruga projekt managera, Hrvatska udruga sudskih vještaka, HKGI – Hrvatska komora građevinskih inženjera

## 2 Lecturer

### 2.1 General data

|                     |                      |                |
|---------------------|----------------------|----------------|
| Name and surname    | E-mail adress        | Web page       |
| <b>KSENIJA ČULO</b> | <b>kculo@gfos.hr</b> | <b>gfos.hr</b> |

### 2.2 Academic status

|                             |                          |
|-----------------------------|--------------------------|
| Academic or teaching status | Date of last appointment |
| <b>Associated professor</b> | <b>1.10.2002.</b>        |

### 2.3 Curriculum vitae

Ksenija Čulo is born 21<sup>st</sup> february 1959., Valpovo, Republic of Croatia. Croat. She graduated on the Faculty of Economic, Osijek, 1981.; departure Organization, she win a master's degree 1993. od the Faculty of Economic, Osijek, departure Economic politics; she win a doctor's degree 1997 on the Faculty of Economic. 1981-1982 – teacher in the Secondary economic school, Osijek; 1982-1983 – head of the computer center in Vinkovci; 1983-1993 – employed in Obnova Osijek on the various economic jobs; 1993 – employed on the Faculty of Civil Engineering, Osijek – assistant on the courses: Engineering Economy and Construction management; since 1998. assistant professor on the Faculty of Civil Engineering, Osijek; since 2002. – associated professor on the course Engineering Economy. 2000-2004 – vicedean for education; since 2004 – vicedean for science; she is a main project researcher financing by Croatian Ministry for science, education and sport; according to field Construction Management she was lecturer in the CARDS project financing by European Union; she is involved in team for CBA in terms of environmental economy; she published over than thirty scientific, professional and educational papers; she is coautor of the book "Civil Engineers on the Way to Europe"; she is active collaborator on two TEMPUS programmes: Quality Assurance System and Bologna Follow up; she is the memeber of the nacional team for implementation Bologna Process on the University in Osijek; she was active participant in more international workshops on University Management..

### 2.4 Recent papers (since 2000)

1. Aničić, Dražen; Čulo, Ksenija: Građevinski inženjeri na putu u Europu. Osijek: Europska unija i Građevinski fakultet Osijek, 2003 (priručnik).
2. Čulo, Ksenija: Ekonomija i ekologija: Modeliranje globalnih odnosa. Informatologia. 4 (2004) , 37; 308-313
3. Čulo, Ksenija; Medanić, Barbara: Some problems of Organizing Project Management // 3rd SENET PM Conference, Project Management Paving the Way to European Union / Igor Travnik (ur.). Bratislava : Project Management Association of Slovakia - SPPR, 2004. 8-9 (međunarodna recenzija, znanstveni rad).
4. Čulo, Ksenija: Formation of the Organization of a Construction Firm in Transition Period // ICPR-17, International Conference on Production Research / Michael P. Deisenroth (ur.). Blackburg, Virginia, USA : Virginia Polytechnic Institute and State University Blacksburg, Virginia, USA, 2003. 1-7
5. Čulo, Ksenija: Organizational Culture in Communication of the Organization with its Surrounding // New Paradigm of Industrial Engineering / Heung Suk Hwang (ur.), Jeju, Korea : Hanyang University, Cheju National University, 2004. CIE505 ; 1-7

### 2.5 Recent papers on course subject

1. Čulo, Ksenija; Zlata Dolaček: Neka motrišta nastajanja rizika u građevinskom poslovanju. // Tehnički vjesnik. 8 (2001) , 1, 2; 3-7.
  2. Čulo, Ksenija; Ribarović, Zoran: Managing Risks in the Construction Industry // 21. znanstvena konferenca o razvoju organizacijskih ved Management in Evropska unija / Goran Vuković (ur.). Kranj : Univerza v Mariboru, Fakulteta za organizacijske vede Kranj, 2002. 393-402.
- Recent papers from 2.4 ; 1.,5.,

### 2.6 Memberships

Croatian Association of Economists  
Croatian Association for Organization, Technology and Engineering Economy

## 2 Lecturer

### 2.1 General data

| Name and surname      | E-mail adress           | Web page                  |
|-----------------------|-------------------------|---------------------------|
| <b>DARKO DUJMOVIĆ</b> | <b>dujmovic@grad.hr</b> | <b>www.grad.hr/metali</b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Associated professor</b> | <b>27.09.2002.</b>       |

### 2.3 Curriculum vitae

1954. born in Gospić.; 1968.-1972. High school in Zagreb; 1972.-1978. Faculty of Civil Engineering in Zagreb; 1989. M.A. degree - Faculty of Civil Engineering in Zagreb; 1996. Ph. D. degree - Faculty of Civil Engineering in Zagreb; 1978.-1981. "Industrogradnja" Zagreb; 1981.-1991. Civil Engineering Institut - Faculty of Civil Engineering in Zagreb, Department for steel structures / Repair, expertise and design group; 1991.- Faculty of Civil Engineering in Zagreb, Department for Structures; 1982. assistant; 1997. higher asistent; 1999. assistant professor; 2002. affiliated professor

Awards: Annual award Croatian association of Civil engineers, 1999.

### 2. 4 Recent papers (since 2000)

1. Androić, Boris; Džeba, Ivica; Dujmović, Darko:  
**INTERNATIONAL STRUCTURAL STEEL SECTIONS - DESIGN TABLES ACCORDING TO EC 3**  
Ernst & Sohn, A Wiley Company, Berlin, 2000., I. dio (6 poglavlja), II. dio (5 poglavlja), 679 str.

2. Androić, Boris; Dujmović, Darko; Džeba, Ivica:  
**BEISPIELE NACH EC-3, BEMESSUNG UND KONSTRUKTION VON STAHLBAUTEN**  
Werner-Verlag GmbH, Düsseldorf, 2001, 5 poglavlja, 601 str.

3. Dujmović, Darko; Androić, Boris; Skejić, Davor:  
**RELIABILITY OF SHEAR DIAPHRAGM MADE OF TRAPEZOIDAL SHEETS**  
20th Czech and Slovak National Conference "Steel Structures and Bridges 2003", Czech Technical University in Prague, Prague, Czech Republic, 2003., Proceedings, pp 493-499

4. Androić, Boris; Dujmović, Darko; Džeba, Ivica:  
**METALNE KONSTRUKCIJE 4**  
IA Projektiranje d.o.o., Zagreb, 2003., 416 str.

5. Dujmović, Darko; Androić, Boris; Džeba, Ivica:  
**MODELIRANJE KONSTRUKCIJA PREMA EUROCODE 3**  
IA Projektiranje d.o.o., Zagreb, 2004., 625 str.

### 2. 5 Recent papers on course subject

1. Dujmović, Darko; Androić, Boris; Džeba, Ivica:  
**MODELIRANJE KONSTRUKCIJA PREMA EUROCODE 3**  
IA Projektiranje d.o.o., Zagreb, 2004., 625 str.

2. Androić, Boris; Dujmović, Darko; Džeba, Ivica:  
**METALNE KONSTRUKCIJE 4**  
IA Projektiranje d.o.o., Zagreb, 2003., 416 str.

3. Androić, Boris; Dujmović, Darko; Džeba, Ivica:  
**BEISPIELE NACH EC-3, BEMESSUNG UND KONSTRUKTION VON STAHLBAUTEN**  
Werner-Verlag GmbH, Düsseldorf, 2001, 5 poglavlja, 601 str.

4. Androić, Boris; Džeba, Ivica; Dujmović, Darko:  
**INTERNATIONAL STRUCTURAL STEEL SECTIONS - DESIGN TABLES ACCORDING TO EC 3**  
Ernst & Sohn, A Wiley Company, Berlin, 2000., I. dio (6 poglavlja), II. dio (5 poglavlja), 679 str.

5. Dujmović, Darko; Tkalčević, Višnja; Vera, Felipe:  
**SEGURIDAD Y CONFIABILIDAD EN EDIFICIOS MONUMENTALES**  
*Ingeniería hoy, 19/2001, 47-53, Revista de la Facultad de Ingeniería Civil, Universidad del Cauca Popayan Colombia*

### 2.6 Memberships

International Association for Bridge and Structural Engineering  
European Convention for Constructional Steelwork - TWG 7.5

## 2 Lecturer

### 2.1 General data

|                    |                     |                           |
|--------------------|---------------------|---------------------------|
| Name and surname   | E-mail adress       | Web page                  |
| <b>IVICA DŽEBA</b> | <b>ivci@grad.hr</b> | <b>www.grad.hr/metali</b> |

### 2.2 Academic status

|                             |                          |
|-----------------------------|--------------------------|
| Academic or teaching status | Date of last appointment |
| <b>Associated professor</b> | <b>27.09.2002.</b>       |

### 2.3 Curriculum vitae

1955. born in Zagreb.; 1969.-1973. Engineering technician school in Zagreb; 1973.-1978. Faculty of Civil Engineering in Zagreb; 1975.-1977. Faculty of architecture in Zagreb; 1993. M.A. degree - Faculty of Civil Engineering in Zagreb; 1996. Ph. D. degree - Faculty of Civil Engineering in Zagreb; 1979.-1991. Civil Engineering Institut - Faculty of Civil Engineering in Zagreb, Department for steel structures; Repair, expertise and design group; 1991.- Faculty of Civil Engineering in Zagreb, Department for Structures  
1979. assistant; 1997. higher assistant; 1999. assistant professor; 2002. affiliated professor

Awards: Annual award Croatian association of Civil engineers, 1999.

### 2.4 Recent papers (since 2000)

1. Androić, Boris; Džeba, Ivica; Dujmović, Darko: **INTERNATIONAL STRUCTURAL STEEL SECTIONS - DESIGN TABLES ACCORDING TO EC 3** Ernst & Sohn, A Wiley Company, Berlin, 2000., I. dio (6 poglavlja), II. dio (5 poglavlja), 679 str.
2. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **BEISPIELE NACH EC-3, BEMESSUNG UND KONSTRUKTION VON STAHLBAUTEN** Werner-Verlag GmbH, Düsseldorf, 2001, 5 poglavlja, 601 str.
3. Markulak, Damir; Džeba, Ivica; Androić, Boris: **A PROBABILISTIC EVALUATION OF THE SAFETY LEVEL OF COMPOSITE ROAD BRIDGES** IABMAS 02, Barcelona, Spain, 2002., Proceedings (In English)
4. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **METALNE KONSTRUKCIJE 4** IA Projektiranje d.o.o., Zagreb, 2003., 416 str.
5. Dujmović, Darko; Androić, Boris; Džeba, Ivica: **MODELIRANJE KONSTRUKCIJA PREMA EUROCODE 3** Projektiranje d.o.o., Zagreb, 2004., 625 str.

### 2.5 Recent papers on course subject

1. Androić, Boris; Džeba, Ivica; Dujmović, Darko: **INTERNATIONAL STRUCTURAL STEEL SECTIONS - DESIGN TABLES ACCORDING TO EC 3** Ernst & Sohn, A Wiley Company, Berlin, 2000., I. dio (6 poglavlja), II. dio (5 poglavlja), 679 str.
2. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **BEISPIELE NACH EC-3, BEMESSUNG UND KONSTRUKTION VON STAHLBAUTEN** Werner-Verlag GmbH, Düsseldorf, 2001, 5 poglavlja, 601 str.
3. Markulak, Damir; Džeba, Ivica; Androić, Boris: **A PROBABILISTIC EVALUATION OF THE SAFETY LEVEL OF COMPOSITE ROAD BRIDGES** IABMAS 02, Barcelona, Spain, 2002., Proceedings (In English)
4. Androić, Boris; Dujmović, Darko; Džeba, Ivica: **METALNE KONSTRUKCIJE 4** IA Projektiranje d.o.o., Zagreb, 2003., 416 str.
5. Dujmović, Darko; Androić, Boris; Džeba, Ivica: **MODELIRANJE KONSTRUKCIJA PREMA EUROCODE 3** IA Projektiranje d.o.o., Zagreb, 2004., 625 str.

### 2.6 Memberships

International Association for Bridge and Structural Engineering  
Croatia Constructors Association

## 2 Lecturer

### 2.1 General data

| Name and surname      | E-mail adress                | Web page |
|-----------------------|------------------------------|----------|
| <b>DRAGUTIN GERES</b> | <b><u>dgeres@voda.hr</u></b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Associated professor</b> | <b>2001</b>              |

### 2.3 Curriculum vitae

Born in 1942 in Slavonski Brod. Married in 1962, two children, Davor and Vesna. Graduated in 1966 and PhD degree got in 1994 all on the Faculty of Civil Engineering University of Zagreb. Since 2001 associated professor on the Faculty of Civil Engineering University of J.J. Strossmayer in Osijek. Foreign languages: English and Spanish excellent, German and French well. Working experience: since 1966-1969 in Baranja basin Water management company; 1969-1978- Consulting firm ETZ in Osijek; 1978-1991 – Consulting firm PKB Belgrade; since 1991 until today Hrvatske vode Zagreb. In the period 1975-1981 director of projects in Peru and Iraq.

Teaching experience: Faculty of Civil Engineering University of J.J. Strossmayer in Osijek – Hydro technical Systems; Faculty of mining, geology and oil survey, University of Zagreb- Water supply systems and irrigation.

Publishing: Editor of 4 publications: Sustainable development and water management (1995), Hydrological prognosis and hydrological inputs for water management (1998), Croatian waters from Adriatic sea to Danube River (1999), Croatian waters in 21st Century (2003). Author of more than 25 chapters in different books and publications and more than 80 scientific and professional papers in national and international journals.

### 2.4 Recent papers (since 2000)

1. Gereš, Dragutin; Rubinić, Josip; Ožanić, Nevenka: Ecological incidents in Northern Adriatic Karst (Croatia). // Water science and technology. 42 (2000.) , 1-2; 281-285 (članak, znanstveni rad).
2. Gereš, Dragutin. Održivo iskorištavanje vode u Hrvatskoj i u Europi. // Građevinar. 54 (2002.) , 6; 345-353 (pregledni rad, znanstveni rad).
3. Gereš, Dragutin. Održivi razvoj vodnih resursa i vodnog gospodarstva, I dio. // Hrvatska vodoprivreda. XIII (2004.) , 134; 25 - 29 (članak, znanstveni rad).

### 2.5 Recent papers on course subject

Over 200 scientific and professional papers in domestic and international journals and proceedings. There are in the Croatian Scientific Bibliography (<http://bib.irb.hr/>)

[Poglavlja u knjizi](#) (33)

[Skripta i udžbenici](#) (8)

[Znanstveni radovi u CC časopisima](#) (1)

[Radovi u ostalim časopisima](#) (37)

[Radovi u časopisu navedenom u Pravilniku iz NN 2/97](#) (8)

[Pozvana predavanja na skupovima](#) (10)

[Ostali radovi u zbornicima skupova](#) (32)

[Sažeci u zbornicima skupova i neobjavljeni radovi](#) (12)

[Radovi u zbornicima skupova s međunar.rec.](#) (22)

[Ostali radovi](#) (2)

### 2.6 Memberships

Croatian Society for Drainage and Irrigation; Croatian Society of Civil Engineers; Croatian Society for Hydrology; Croatian Society for Water and Sea Protection; International Hydrological Programme- Croatian committee, International association of hydro geologists -IAH, United Kingdom, National Geographic Society, USA. Member of Editorial boards: «Hrvatske vode» since 1993, and «Građevinar» since 1996

## 2 Lecturer

### 2.1 General data

| Name and surname    | E-mail adress                 | Web page           |
|---------------------|-------------------------------|--------------------|
| <b>IVICA GULJAŠ</b> | <b><u>iguljas@gfos.hr</u></b> | <b>www.gfos.hr</b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Assistant Professor</b>  | 2005.                    |

### 2.3 Curriculum vitae

Born in 1966. in Batina, Republic of Croatia.

Education: Doctor of Technical Sciences (Ph.D.), 2004. Thesis: «Performance based seismic design of reinforced concret wall structures», University of Osijek, Faculty of Civil Engineering;

Master of Technical Sciences, 1998. Thesis: «Determination of concrete fracture mechanics parameters by means of wedge splitting test method», University of Zagreb, Faculty of Civil Engineering Bachelor of Civil Engineering, 1992. University of Zagreb, Faculty of Civil Engineering

He is a structural engineer, whose research is concerned with inelastic and performance based procedures in earthquake resistant design, as well as with structural codes and computerized design methods for RC structures and implementation of the Eurocode in the national standards. His teaching activities involve Structural Dynamics and Structural Stability at the Faculty of Civil Engineering Osijek. As an active participant of several scientific projects, he has written more than 20 papers dealing with theoretical and practical aspects of dynamic analysis. He speaks english and hungarian.

### 2.4 Recent papers (since 2000)

1. Sigmund, V.; Guljaš, I.; Stanić, A.; Nelinearni odgovor konstrukcija dimenzioniranih hrvatskim i europskim normama, Građevinar 54 (2002) 1, str. 1-13, Zagreb, 2002.
2. Sigmund, V.; Guljaš, I.; Stanić, A.: Comparison of the Seismic Response of Structures Designed According to HRN and EC8, The Twelfth European Conference on Earthquake Engineering, 9-13. September 2002, London, UK, 2002.
3. Sigmund, Vladimir; Brana, Petar; Guljaš, Ivica; Zovkić, Jurko; Stanić, Andreas: Evaluation of the Structural State by Vibration Measurements, 1st Symposium Computing in Engineering Faculty of Civil Engineering, University of Zagreb, Zagreb, Hrvatska : Građevinski fakultet Sveučilišta u Zagrebu, 2003. str. 67-75.
4. Stanić, A.; Sigmund, V.; Guljaš, I.: Behavior of the Walls Under In-plane Horizontal Loadings, Fib-Symposium: Concrete Structures in Seismic Regions. Athens: Tech. Ch. of Greece, 2003; p. 224-225.
5. Stanić, A.; Sigmund, V.; Guljaš, I.: Seismic capacity of Structural Elements Using Neural Networks, 13<sup>th</sup> World Conference on Earthquake Eng, Conference Proceedings, Vancouver, Canada, 2004; p. 403-410.
6. Guljaš, I.; Sigmund, V.: Simplified performance Based Design Procedure of Wall Buildings, Durability and Maintenance of Concrete Structures; Proceedings of the International Symposium organized by Croatian Society of Structural Engineers and Austrian Society for Concrete and Construction Technology, Dubrovnik, Croatia, October 21-23. 2004. p. 209-216.

### 2.5 Recent papers on course subject

1. Herman, K.; Sigmund, V.; Guljaš, I.: Stability Studies of Water Tower's Vertical Flanges, IABSE Symposium "Structures for the Future – The Search for Quality", Rio de Janeiro, August 1999, IABSE Report Volume 83, p.192-193 + CD ROM, Zurich, 1999.
2. Sigmund, Vladimir; Brana, Petar; Guljaš, Ivica; Zovkić, Jurko; Stanić, Andreas: Metodologija procjene stanja građevinskih konstrukcija, Zlatni sabor Hrvatskog društva građevinskih konstruktora / Jure Radić (ur.). Zagreb, Hrvatska : HDGK, 2003. str. 361-369.

### 2.6 Memberships

Croatian Association of Civil Engineers, Croatian Society of Structural Engineers, Croatian Society of Mechanics.



## 2 Lecturer

### 2.1 General data

| Name and surname      | E-mail adress   | Web page   |
|-----------------------|---|--|
| <b>TOMISLAV HENGL</b> | <b><a href="mailto:hengl@pfos.hr">hengl@pfos.hr</a></b> | <b><a href="http://hengl.pfos.hr">http://hengl.pfos.hr</a></b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Assistant professor</b>  | <b>03/2004</b>           |

### 2.3 Curriculum vitae

Tomislav Hengl was born on 15th January 1974 in Osijek, where he finished Gymnasium of Natural Sciences. After the high school, in 1992, he entered Faculty of Forestry, University of Zagreb. He was employed by the Faculty of Agriculture in Osijek in March 1998 and started his MSc study at the Soil Science Division of the ITC. In February 2000, he graduated with distinction with a MSc thesis entitled Improving soil survey methodology using advanced mapping techniques and grid-based modelling case study – Baranja, Croatia. He continued with the PhD study the same year. He successfully completed the postgraduate program of the Production Ecology & Resource Conservation postgraduate school in Wageningen and defended his thesis in September 2003. He is currently leading the AGIS centre, the scientific centre specialized for application of Geoinformation technologies in natural resource management.

### 2.4 Recent papers (since 2000)

1. Hengl T., Gruber S., Shrestha D.G. (2003): Reduction of errors in digital terrain parameters used in soil-landscape modelling. International Journal of Applied Earth Observation and Geoinformation, 5, in press.
2. Hengl T., Heuvelink G.M.B., Stein A. (2003): A generic framework for spatial prediction of soil variables based on regression-kriging. Geoderma, 123, in press
3. Hengl T. (2003): Pedometric mapping: bridging the gaps between conventional and pedometric approaches. PhD thesis, Wageningen University and ITC, ISBN: 90-5808-896-0.
4. Hengl T., Rossiter D.G. (2002): Supervised landform classification to enhance and replace photo-interpretation in semi-detailed soil survey. Soil Science Society of America Journal, 67(5): 1810-1822.
5. Hengl T., Jurišić M., Martinić I., Husnjak S. (2001): Satelitska navigacija (GPS) - trendovi i primjena (Satellite Navigation (GPS) - Trends and Applications) Strojarstvo, 43(1-3): 49-56.
6. Jurišić M., Hengl T., Bukvić Z., Emert R. (1998): Geoinformacijske tehnologije i gospodarenje okolišem (Geoinformation technologies and environmental management). Strojarstvo, 40(5-6): 215-220.

### 2.5 Recent papers on course subject

1. Hengl T. (2003): Pedometric mapping: bridging the gaps between conventional and pedometric approaches. PhD thesis, Wageningen University and ITC, ISBN: 90-5808-896-0.
2. Hengl T., Jurišić M., Martinić I., Husnjak S. (2001): Satelitska navigacija (GPS) - trendovi i primjena (Satellite Navigation (GPS) - Trends and Applications) Strojarstvo, 43(1-3): 49-56.
3. Jurišić M., Hengl T., Bukvić Z., Emert R. (1998): Geoinformacijske tehnologije i gospodarenje okolišem (Geoinformation technologies and environmental management). Strojarstvo, 40(5-6): 215-220.

### 2.6 Memberships

Int. Union of Soil Sciences, Provisional Division on Pedometrics ([www.pedometrics.org](http://www.pedometrics.org))  
Soil Science Society of America, USA, member.  
Croatian Soil Science Society, Zagreb, member

## 2 Lecturer

### 2.1 General data

| Name and surname    | E-mail adress         | Web page |
|---------------------|-----------------------|----------|
| <b>ŽELJKO KOŠKI</b> | <b>zkoski@gfos.hr</b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Assistant professor</b>  | <b>July 2001.</b>        |

### 2.3 Curriculum vitae

Željko Koški was born on May 10, 1956. He finished primary and Grammar school in Osijek. In 1982 he graduated at the Faculty of the Architecture of the University in Zagreb. In 1984 he passed the licence examination in civil engineering. One sector was building physics. Since 1985 he has been employed as senior researcher and assistant in the Civil Engineering Institute – Faculty of Civil Engineering, University of Osijek. In 1986 he introduced new works of heat insulation measuring on the site in building structures at the Faculty of Civil Engineering. In the frame of teaching activities on the Faculty he is leading the exercises for the course Elements of Building Construction and exercises and lectures for course Building Physics. From 1986 till 1990 he was engaged (as a researcher) in the research project "Energy Savings in Building Construction" which was coordinated on the level of Civil Engineering Institute. During the Homeland War he led the reconstruction of some military buildings for health organizations in the war conditions. In 1996 he was involved in the programme for technical collaboration in the field of housing and urban planning in Poland which was organized by the Agency for International Development of USA Government. In 1999 he was registered as a certified architect (under series number 1698) according to the Law of Croatian Chamber of Architects and Engineers in Construction Industry. At the beginning of 2001 he was in the city of Copenhagen and participated in the seminar of Democratic fond about Danish experience in leading the Cities organized by the Ministry of Foreign Affairs of Denmark Kingdom. In 2001 he was elected assistant professor. In the same year he was elected the president of Architects Society of the City of Osijek. He was involved in realization of many city projects as well as in the work of Society of Croatian Architects. In 2002 and 2003 he was an active participant of World Congresses on Housing in Portugal and Canada.

### 2.4 Recent papers (since 2000)

1. Ž. Koški : Traditional Slavonian house and use of solar energy; Građevinar, magazine of Croatian society for civil engineering engineers, Zagreb, no. 9 September 2000.
2. Ž. Koški : Sunspace as an Element in the Reconstruction of the Existing Residential buildings in the City of Osijek, World Congress on Housing; September 9.-13. 2002. Coimbra, Portugal
3. Ž. Koški : Preliminary design for solar house Solar-system, Donjodravaska obala 49, Osijek 2002.
4. Ž. Koški : Preliminary and Main design for residential-business building, Stepinčeva 35, Osijek 2003.
5. Ž. Koški : Preliminary and Main design for the reconstruction and extension for middle school Ivan Švear, Školska 12, Ivanić Grad 2004.

### 2.5 Recent papers on course subject

1. Ž. Koški : Sunspace as an Element in the Reconstruction of the Existing Residential buildings in the City of Osijek, World Congress on Housing; September 9.-13. 2002. Coimbra, Portugal
2. Ž. Koški : Preliminary design for solar house Solar-system, Donjodravaska obala 49, Osijek 2002.
3. Ž. Koški : Preliminary and Main design for residential-business building, Stepinčeva 35, Osijek 2003.
4. Ž. Koški : Preliminary and Main design for the reconstruction and extension for middle school Ivan Švear, Školska 12, Ivanić Grad 2004.

### 2.6 Memberships

Architects society of the city of Osijek and Society of Croatian architects  
Croatian Chamber of Architects and Engineers in Construction Industry  
ISES – International Solar Energy Society  
Croatian EUROPLAN

## 2 Lecturer

### 2.1 General data

| Name and surname       | E-mail adress | Web page |
|------------------------|---------------|----------|
| <b>ZLATKO LACKOVIĆ</b> |               |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Associate professor</b>  |                          |

### 2.3 Curriculum vitae

Zlatko Lacković was born on January 11, 1947 in Brođanci. He completed his elementary-school education in his birthplace of Brođanci and a technical vocational school in Osijek. Having graduated in 1970, he has earned a BEE academic title. In 1973, he enrolled into an economics course of studies at the Josip Juraj Strossmayer University's School of Economics, having graduated in 1977 and earning a BBA academic title. He enrolled into the Business Policy postgraduate course of studies at the same school in 1979. On April 11, 1996, he has successfully defended his doctoral thesis titled Financing the R&D Operations in the Investment-Servicing Activities as a Fundamental Factor of Business Strategy at the Osijek-based Josip Juraj Strossmayer University's School of Economics. Mr. Lacković has mastered his basic education by specialist courses and longer study visits at a number of world's universities, e.g., in the US (Stanford University, Palo Alto, UC Berkeley), Canada (University of British Columbia in Vancouver), and the FRG (Pforzheim and Heidelberg Universities), as well as at a series of technical high schools and other polytechnics. This includes his longer specialization at the Vienna-based Small Company Institute's Economics University and other expert and scientific associations, as well as the renowned companies like Monting-Montage and Bau-Montage from Vienna, Austria. Mr. Zlatko Lacković has been incessantly employed since 1970. He began his business career as a high school teacher at the Osijek-based Electrometallic Vocational School Center (1970 – 75), as well as an extern at other vocational high schools. From 1975 to 1980, he worked in the economy in the foreign-trade design activities (Economic-Technical Institute and the Customs Office in Osijek). From 1980, Mr. Lacković is employed with the Osijek-based Elektrometal electrical engineering company in his capacity as CEO. Subsequent to the 1992 privatization of the aforementioned company, he was employed as the Managing Board President, the duty he discharged up to 2004, when he commenced with his consultative and professorial activity. As a perennial economist, he is a member of several forums within the Croatian Chamber of Commerce. For its business results, the Elektrometal company has received the Croatian Chamber of Economy's Plaque, while he was personally awarded by the Great Seal of the City of Osijek and a series of other economic and social honors.

### 2.4 Recent papers (since 2000)

1. Lacković, Z., Management malog poduzeća, Građevinski fakultet, Osijek, 2004.
2. Lacković Z. , Posebnosti proizvoda kao bitnog elementa marketing miksa u graditeljstvu, časopis, Ekonomski pregled, broj 7-8/2001, Zagreb, 2001, str.873-888-Izvorni znanstveni rad, ISSN 0424-7558.
3. Lacković, Z; Management of market-research processes in investment activities, Zbornik radova , 21. Znanstvena konferenca o razvoju organizacijskih ved, Portorož 2002, 27.-29. Ožujak 2002. godine,
4. Lacković, Z; Situational Analysis in a Construction Company for the Sake of a Marketing Strategy Selection, Management in razvoj organizacije, ,2003 str. 532- 541,
5. Lacković Z. "Logistika kao bitan čimbenik učinkovitosti u graditeljstvu", " Poslovna logistika u suvremenom managementu", Ekonomski fakultet, Osijek, travanj 2001 godine, str.259-276.

### 2.5 Recent papers on course subject

1. Lacković Z. , "Financijski kontroling u graditeljstvu", Hrvatska gospodarska revija 1, Zagreb 1998., stranice 65-72, Izvorni znanstveni rad, ISSN 1330-9145.
2. Lacković Z. "Temeljni čimbenici promocije u graditeljstvu", Poslovna analiza i upravljanje, broj 4-5, Zagreb 1998., stranice 23-29, Pregledni rad, ISSN 1330-9129.
3. Lacković, Z.; "Marketing strategija hrvatskog graditeljstva u uvjetima tranzicije", VI. tradicionalno savjetovanje HDO "Gospodrska politika Hrvatske", Opatija 1998. stranice 295-306. ISBN 953-6447-20-7.

### 2.6 Memberships

Croatian association of electro engineers, Croatian association of economists, Croatian association for systems, Croatian association of maintenance

## 2 Lecturer

### 2.1 General data

| Name and surname   | E-mail adress        | Web page |
|--------------------|----------------------|----------|
| <b>DAVOR MALUS</b> | <b>malus@grad.hr</b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>ASSOCIATED PROFESSOR</b> | <b>2004</b>              |

### 2.3 Curriculum vitae

Born on August 30, 1951 in Zagreb, Croatian nationality and citizen of Republic of Croatia. Primary and secondary school finished in Zagreb. Graduated in 1977 on Faculty of Civil Engineering University of Zagreb, hydrotechnical branch. Since 1979 employee of the same faculty in the Department for sanitary engineering. In 1985 got master degree on the Faculty of Technology University of Zagreb, branch of environmental engineering with thesis titled "Waste Water of the Hydro power plant Dubrava area". PhD degree got in 1995 with thesis titled "Water resources management in the strategy of sustainable development". I am a lecturer on the graduate and postgraduate studies: Water supply and sewage systems and Water protection. Also, I am involved in the scientific research in the same branches.

### 2.4 Recent papers (since 2000)

1. Malus, D., Petraš, J.: Highway Runoff Treatment in Croatia, Water Supply and Water Quality, IVth International Conference, Poznan – Krakow, 2000., Proceedings, p. 311-323.
2. Vukelić, Z., Petraš, J., Malus, D.: Groundwater – The Unseen Resource and Subsurface Quality, Water Supply and Water Quality, V th International Conference, Poznan – Krakow, 2002., Proceedings, p. 205 - 215.
3. Malus, D.: Pročišćavanje otpadnih oborinskih voda pri projektiranju prometnica, Okrugli stol: Urbana hidrologija, Split, 25. – 26. travnja 2002. Zbornik radova, str. 141.-151.
4. Čosić-Falajsig, G., Malus, D., Petrićec, M.: Importance of Protected Areas in Integrated Management, VIII International symposium on Water Management and Hydraulic Engineering. Podbanske – Slovačka, 5-9.10.2003. Proceedings, p.49 –54.
5. Malus, D., Čosić-Falajsig, G.: Wastewater Collection, Treatment and Disposal in Small Communities in Croatia. VIII International symposium on Water Management and Hydraulic Engineering. Podbanske – Slovačka, 5-9.10.2003. Proceedings, p. 243-248.
6. Petraš, J., Malus, D.: Hydrology of Detention Basins as Constituents of Flood Protection Systems of Zagreb City. VIII International symposium on Water Management and Hydraulic Engineering. Podbanske – Slovačka, 5-9.10.2003. Proceedings, p.335-352.

### 2.5 Recent papers on course subject

1. Malus, D.: Pročišćavanje otpadnih oborinskih voda pri projektiranju prometnica, Okrugli stol: Urbana hidrologija, Split, 25. – 26. travnja 2002. Zbornik radova, str. 141.-151.
2. Malus, D., Čosić-Falajsig, G.: Wastewater Collection, Treatment and Disposal in Small Communities in Croatia. VIII International symposium on Water Management and Hydraulic Engineering. Podbanske – Slovačka, 5-9.10.2003. Proceedings, p. 243-248.

### 2.6 Memberships

Association, Hrvatsko društvo građevinskih inženjera, Hrvatsko društvo za zaštitu voda i mora, Hrvatska komora arhitekata i inženjera u graditeljstvu

## 2 Lecturer

### 2.1 General data

|                      |   |          |
|----------------------|---|----------|
| Name and surname     | E-mail adress   | Web page |
| <b>SAŠA MARENJAK</b> | <b><a href="mailto:Sasa.marenjak@zg.htnet.hr">Sasa.marenjak@zg.htnet.hr</a></b> |          |

### 2.2 Academic status

|                             |                          |
|-----------------------------|--------------------------|
| Academic or teaching status | Date of last appointment |
| <b>Assistant Professor</b>  | <b>21.09.2004.</b>       |

### 2.3 Curriculum vitae

Saša Marenjak was born 22.nd of April 1966. in Čaglin, Požeško-Slavonska county, Croatia. B. Sc. (Honours) 1985-1990 Faculty of Civil Engineering, University of Zagreb.  
Principal Courses: Construction Project Management, Project Planning, Cost Estimation and Control, Construction Materials, Construction Technology. M. Sc. 1992-1995 Faculty of Civil Engineering (Dept. of Construction Management), University of Zagreb; Thesis Title: Integrated cost and time model for Planning and Controlling Construction Projects. Ph.D. Dundee University, Construction Management Research Unit (Civil Engineering Division), submitted to the supervisor in September 2003. Thesis Title: A New Way of Reducing Whole Life Costs in the Building Industry

### 2.4 Recent papers (since 2000)

1. Marenjak S., Modeli procjenjivanja troškova, Građevinar, Br. 5, svibanj 1999, str. 341-347
2. El-Haram M. A, Marenjak S., Horner R.M.W. (2002). Development of a Generic Framework for Collecting Whole Life Cost Data for the Building Industry, Journal of Quality in Maintenance Engineering, MCB University Press, Vol. 8, No. 2, pp 144-151
3. Marenjak S., El-Haram M., Horner R.M.W. (2002) Procjena ukupnih troškova projekata u visokogradnji, Građevinar, Vol. 54, Br.7, str. 393 – 401
4. Marenjak S., Horner R.M.W., El-Haram M. (2003) Privatno ulaganje za objekte visokogradnje u Hrvatskoj, Građevinar, Vol. 55, Br. 7, str. 383-389.
5. El-Haram M. A, Marenjak S., Horner R.M.W. (2001). The use of ILS techniques in the Construction Industry. The 11<sup>th</sup> MIRCE International Symposium, 4-6 prosinac 2001, The MIRCE Academy, Exeter, pp 103-112.
6. El-Haram M. A, Marenjak S., Horner R.M.W. (2002) Generic Approach for Structuring WLC data for the Construction Industry, In Knezevic J. (ed.), 12<sup>th</sup> MIRCE International Symposium on System Operational Effectiveness, ISSN 1470-9171, prosinac 2002, The MIRCE Academy, pp 54-61, Exeter.
7. Marenjak S., El-Haram M., Horner R.M.W. (2003) A Generic Approach to Minimise Whole Life Costs in the Building Industry, In Greenwood, D. (ed.), 19<sup>th</sup> Annual ARCOM Conference, 3-5 September 2003, University of Brighton. Association of Researches in Construction Management, Vol. 1, 53-62, Brighton.
8. Marenjak S.: Inicijalni i ukupni troškovi građevina, Sabor Hrvatskih Graditelja; «Graditelji - nositelji razvojnih projekata R. Hrvatske», Cavtat, travanj 2004, pp. 695-702.
9. Marenjak S.: Project Manager versus Facilities Manager ; Similarities and Differences, Proceedings of the 3rd SENET PM Conference / Travnik, Igor (ur.). Bratislava : International Cost Engineering Council, Project Management Association of Slovakia, Slovak University of Technology, Faculty of Civil Engineering, 2004. 12 (1-4).

### 2.5 Recent papers on course subject

Recent papers in 2.4; 1., 3., 7., 8.

### 2.6 Memberships

HUUP - Hrvatska udruga za upravljanje projektima, PMA - Project Management Austria, ARCOM – Association of Researchers in Construction Management

## 2 Lecturer

### 2.1 General data

|                       |                                |          |
|-----------------------|--------------------------------|----------|
| Name and surname      | E-mail adress                  | Web page |
| <b>DAMIR MARKULAK</b> | <b><u>markulak@gfos.hr</u></b> |          |

### 2.2 Academic status

|                             |                          |
|-----------------------------|--------------------------|
| Academic or teaching status | Date of last appointment |
| <b>Assistant Professor</b>  | <b>1. 10. 2002. g.</b>   |

### 2.3 Curriculum vitae

I was born on April 23rd, 1968. in Osijek. I have graduated in the year 1993. at the University of Zagreb, Faculty of Civil Engineering, with major in the structural engineering. During the studies I have received several awards, most prominent among are Rector's award at University of J. J. Strossmayer in Osijek and Rector's award at University of Zagreb for outstanding student's project. I started my graduate studies at the University of Zagreb, Faculty of Civil Engineering, in the field Structural engineering in 1993. and at the same time I worked at the University of J. J. Strossmayer, Faculty of Civil Engineering, as teaching and research assistant at the Department of Steel Structures. As assistant I was involved in teaching at the subjects Steel Structures I and II and Information Systems and application of the computers. I have received master's degree in structural engineering in 1996. (master thesis: «Durability of the steel road bridge from the aspect of fatigue»). I have received PhD degree in 2001. with thesis «Probabilistic evaluation of the safety level of composite road» bridges and in 2002. I was elected as Assistant professor and since then I work as lecturer on courses Steel Structures I and II at the undergraduate studies. Since 1998. I work at scientific research project «Safety of the structures from the aspect of action statistical data», financed from Ministry of Science and High Education (chief researcher prof. Boris Androić) and technological-research project «Development of new types of electrical and telecommunication columns» (chief researcher prof. Ivica Džeba). Currently I work at scientific research project «Development of structural systems on the basis of probabilistic methods», financed from Ministry of Science and High Education (chief researcher prof. Ivica Džeba).

### 2.4 Recent papers (since 2000)

1. D. Markulak, B. Androić, D. Pulić: Comparison of the fatigue load model of road bridges in Croatia corresponding to EC, Proceedings of the International Conference on «Steel Structures of the 2000's», Istanbul 2000.g., str. 293-298
2. D. Markulak, I. Džeba, B. Androić: A probabilistic evaluation of the safety level of composite road bridges, - Proceedings of IABMAS'02, First International Conference on Bridge Maintenance, Safety and Management, Barcelona, Spain, 2002
3. Džeba, D. Markulak, V. Tkalčević: Reliability indices obtained by calibration of composite structures in Croatia, 20<sup>th</sup> Czech and Slovak National Conference, Praha 2003., str. 83-88
4. D. Markulak, B. Androić: Modeliranje stvarnog prometnog opterećenja cestovnih mostova, Građevinar 55 (2003) 3, str. 129-135

### 2.5 Recent papers on course subject

1. N. Truhar, D. Markulak, D. Varevac: Optimizing stiffnesses and positions of dampers for cables on the steel high voltage towers, Proceedings of IS-APMEF 2002, Pecs 2002.
2. D. Markulak, I. Džeba: Indeksi pouzdanosti cestovnih spregnutih mostova, Zbornik radova sa Sabora hrvatskih graditelja 2004, Cavtat, str. 465-474
3. V. Leko, D. Markulak, D. Varevac: Suvremene konstrukcije izrađene u materijalu Fe 360 i Fe 510, Zbornik radova DHGK «Suvremeni postupci izvedbe», 1995.

### 2.6 Memberships

Member of Society of Croatian Structural Engineers (SCSE), Croatian Open System Society (CROSS), Croatian Society for Steel Structures. Since 1999. member of Croatian Chamber of Architects and Engineers in Civil Engineering. Since 2000. member of Technical Committee DZNM/TO 167, Steel Structures.

## 2 Lecturer

### 2.1 General data

| Name and surname       | E-mail adress           | Web page       |
|------------------------|-------------------------|----------------|
| <b>BARBARA MEDANIĆ</b> | <b>bmedanic@gfos.hr</b> | <b>gfos.hr</b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Full Professor</b>       | <b>2001.</b>             |

### 2.3 Curriculum vitae

She is born 26<sup>th</sup> april 1936. in Osijek, Republic of Croatia, Croat.Elementary and Secondary school she finished in Osijek, 1952. 1959. she was enter Faculty of Economics at the University in Zagreb and she graduated first level in 1961. Doctor's degree (scientific field Statistics) she received 1967. on the Faculty of Economics, University in Zagreb. After doctorate study in the Management field she realized in 1968. and 1969. as the part of Stanford University, USA programme and Interuniversity Centre for scientific research about business in ex Yugoslavia. She received internacional diploma for enterprise director. She is employed continually from 1954. and she had over 50 years of service. First seven years she realized in economy in the accounting-financing function.1961.-1964. she was employed in Institute for industry economics in Osijek as professsional and higher professional collaborator. 1965-1972 she was employed as scientific assistant and scientific collaborator in the Institute for Economics in Osijek. 1972-1976 she was adviser for sistem and price politics in the Nacional office for prices in Belgrade. 1977-1980 she was assistant director for methodological decision making problems in the Institute for socially planning, Osijek county. From 1980 to this day, she is emplyed continually as associated professor, full professor in the University of Josip Juraj Strossmayer in Osijek – Higher tecnical construction school, Faculty of Civil Engineering in Osijek. During this years, three times she was faculty dean, then chief of the Sub-department for construction management. From the very beginning (1992), she is head of the Department for organization, technology and management.From 1981. she initiated and she is leader in the continually research project "Long-term development of the croatian construction and it's supporting industry" which part is "Education on the micro and macro management. 1994.-2000. she was actively involved in realization interenational project "Management and entrepreneurship", led by Ph.D. Ivo Vajić, professor. She is close collaborator with the Monash University in Melburne, Western Australian University in Perth, Australia, University in Bremen, Germany and occasionally with the other universities from Europe. To date, she published 212 papers.

### 2. 4 Recent papers (since 2000)

1. Medanić,B., Čulo, K.; «Construction business quality», 6th Int. Conf. on Quality, Kuala Lumpur- Malaysia, 17-20.February 2002., pages 667-672
2. Medanić,B.; «Internacionalizacija visokoškolskog obrazovanja i obrazovna budućnost građevinarstva», «Građevinar» - Zagreb, , 54 (2002), 7;
3. Medanić, B.; Borozan,Đ.; «Okruženje i gospodarski utjecaj građevinarstva na razvitak» - hrvatski primjer, Građevinski fakultet Osijek, 2003., 35 stranica
4. Medanić, B., Psunder,M.; «The Level and the Quality of Management in Construction industry – causes and consequences», 7th Int. Conf. on Quality, Kuala Lumpur- Malaysia, Procedings, pages 220-239.
5. Medanić,B.,Pšunder,I.,Skendrović,V.;«Neki aspekti financiranja u građevinarstvu»,Građ.fak. Osijek, 2004.
6. Medanić,B.; Čulo,K.; «Primjena statistike u građevinarstvu», «Građevinar» - Zagreb, 56 (2004), 11;
7. Medanić,B.; «Kvaliteta poslovanja građevinskih poslovnih tvrtki – I dio», «Graditelj» (2004), 7-8;
8. Medanić,B.; «Rad građevinskih tvrtki», II dio«Upravljanje građevinskim poslovanjem»,Graditelj»XI (2004),
9. Čulo, K.;Medanić, B.: Some problems of Organizing Project Management, 3rd Conference, Bratislava :
- 10.Medanić,B.; «Recentna razina i bonitet upravljanja i rukovođenja u hrvatskom građevinarstvu», «Ekonomski pregled», časopis Hrvatskog društva ekonomista, 56 ( u tisku), 2005.

### 2. 5 Recent papers on course subject

1. Medanić,B.; «Management u građevinarstvu», Sveučilišta u Zagrebu, Splitu, Rijeci i Osijeku- Građevinski fakulteti Zagreb, Split, Rijeka i Osijek, 1997., sveučilišni udžbenik, 368 stranica

### 2.6 Memberships

CIB – International Council for Research and Innovation in Building and Construction, Working commision  
55-Construction economics, EAIE- European Assotiation for International Education, Croatian Association of Economists

## 2 Lecturer

### 2.1 General data

| Name and surname    | E-mail adress                | Web page       |
|---------------------|------------------------------|----------------|
| <b>DRAGAN MORIĆ</b> | <b><u>dmoric@gfos.hr</u></b> | <b>gfos.hr</b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment           |
|-----------------------------|------------------------------------|
| <b>ASSOCIATE PROFESSOR</b>  | <b>March 11<sup>th</sup> 2003.</b> |

### 2.3 Curriculum vitae

Born in 1953. 1978. B.Sc. degree, 1985 M.Sc. degree and 1998 Ph.D. degree, all in field of theory of bearing structures, at Faculty of Civil Engineering, University in Zagreb.

From 1979. To 1993. Collaborator on following scientific projects: "Mechanical behaviour of concrete reinforced by steel fibres" Polytechnic Krakow, Polska, 1982. -1984. "Tensile strengths of brick and stone walls", 1984. -1986. "Earthquakes and dynamic behaviour of road bridges", project financed by Department of Transportation, Washington DC, USA. 1988.-1990. Experimental and theoretical investigation of prefabricated structural elements", 1991-1993. "Non-linear seismic analysis of girder bridges".

From 1993. Senior researcher on following scientific projects: 1993. -1996. "Seismic resistance of cultural heritage", 2001. -2005. "Seismic damage spectrum of regular structures"

From 1978. to 1999. Worked in Civil Engineering Institute of Croatia in Zagreb, Department for structures in fields of earthquake engineering, structure design, testing of structures, dynamic of structures and strengthening of existing old heritage structures.

From January 1<sup>st</sup> 2000. Work at Faculty of Civil Engineering, University J.J. Strossmayer in Osijek.

### 2. 4 Recent papers (since 2000)

1. D. Morić, M. Hadzima, Hysteretic Energy Spectrum of Regular Structures, Proceedings of the International Symposium "Durability and Maintenance of Concrete Structures", 163-170, Dubrovnik, 21-23.10. 2004.
2. D. Morić, M. Hadzima, Simplified Seismic Analysis of RC Structures, Proceedings of the International Symposium "Durability and Maintenance of Concrete Structures", pgs 155-162., Dubrovnik, 21-23.10. 2004.
3. I. Netinger, D. Morić, Serviceability limit state of reinforced concrete tank, Proceedings of the International Symposium "Durability and Maintenance of Concrete Structures", pgs 217-224., Dubrovnik, 21-23.10.2004.
4. D. Varevac, D. Morić, N. Truhar, Mathematical model for calculating eigenvalues of continuous bridge girder in transversal direction, Proceedings of the International Symposium "Durability and Maintenance of Concrete Structures", pgs 147-154., Dubrovnik, Croatia, October 21-23., 2004.
5. D. Morić, M. Hadzima, D. Ivanušić, Seismic Damage Model for Regular Structures, International Journal for Engineering Modelling, 14 (2003), 1-4, pgs. 29-44. (original scientific paper)
6. D. Morić, Floor Structures and Seismic Resistance of Cultural Heritage Stone Masonry Buildings, Publication No.3. "Scientific projects", Civil Engineering Faculty University J.J. Strossmayer in Osijek, 2003.
7. D. Morić, M. Hadzima, D. Ivanušić, Seismic Damage Analysis of Reinforced Concrete Structures, Tehnički vjesnik, 9 (2002), 1.2.2002, pgs 13-26. (izvorni znanstveni rad).
8. D. Morić, M. Hadzima, D. Ivanušić, Non-linear Dynamic Response Analysis of Regular Structure Using SDOF Modelling Principles, Proceedings of International Symposium "40th Anniversary of Pollack Mihaly College of Engineering", Pecs, Hungary, Vol 1. pgs. 170-186., 2002.

### 2. 5 Recent papers on course subject

1. D. Morić, Beton ojačan čeličnim vlaknima, Građevinar, Vol. 34, br. 10, 1982, str. 373-378. (pregledni rad)
2. D. Morić, Vulnerability Function for Modern R-C Shear Walls Structures Using P-d Story Diagrams, Eight European Conference on Earthquake Engineering, Lisbon, September 7-12.1986, Vol.3. pgs.6.5/17-23.
3. D. Morić, Duktilitet i seizmička otpornost armiranobetonskih konstrukcija, DGIT, Zagreb, Zbornik radova stručnog seminara "Potrebno građevinarstvo", Zagreb, 1987. god.
4. Z. Sorić, D. Morić, Teorijska analiza lokalnih napona prijanjanja, Građevinar, Vol.41, No.8, 1989, str.95-102.
5. Z. Sorić, D. Morić, Reinforced Bond and Slip in Masonry- Concrete Floor Diaphragm, V North American Masonry Conference, University of Illinois at Urbana-Champaign, June, 3.-6. 1990. pgs. 1511-1522.

### 2.6 Memberships

National TC108 Vibrations and shocks. ISO TC 108, WG 3 Vibrations of stationary structures.



## 2 Lecturer

### 2.1 General data

| Name and surname       | E-mail adress           | Web page |
|------------------------|-------------------------|----------|
| <b>MENSUR MULABDIĆ</b> | <b>leta@zg.htnet.hr</b> | -        |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>associate professor</b>  | <b>May, 2001</b>         |

### 2.3 Curriculum vitae

Born on March 11th 1956 in Bos. Dubica, BiH, where he finished his secondary school. Graduated at Civil Engineering Faculty University in Zagreb, 1978, where he also received his Master degree, 1985. and doctoral degree in 1992. In the period 1979-1998 worked at the Croatian Civil Engineering Institute as researcher, head of the geotechnical laboratory, and designer. Also involved with development and improvement of soil and rock testing procedures. As a Lecturer (assistant and scientific assistant) worked at the Civil Engineering Faculty in Zagreb (that time FGZ Zagreb) for the subject Soil Mechanics and foundation, 1979-1985. Spent three years as a guest researcher at the Swedish Geotechnical Institute, 1989-1992. For about two years has been working in Algeria on projects related to dam construction and airport construction (1984 – 1988). Professional domain: geotechnics, environmental geotechnics, geosynthetics in earth work, in terms of material testing, design and instrumentation and measurement. Was member of many scientific projects in Croatia and abroad. As designer and adviser participated in many projects related to roads, dams, landfills, excavations, foundations and harbour pavement. Member of National Technical Committee for Geotechnics (TO 182) and Geosynthetics (TO 221). Member of COST projects in Europe (COST 337, COST 348). Lecturer at postgraduate studies at the University in Osijek (Civil Engineering Faculty, Environmental Study). National expert for accreditation of geotechnical laboratories. Active in getting students and young people involved in research projects.

### 2.4 Recent papers (since 2000)

1. Mulabdić, M. i Brunčić, A. (2000.). Prilog analizi primjene dilatometra Marchetti, Građevinar, Vol 52, No.1, pp 9-17
2. Mulabdić, M. i Glavaš, T. (2000.). Određivanje konzistentnog stanja tla, Građevinar Vol. 52, 12.2000.
3. Mulabdić, M. (2001). Settlement of a building founded on soil improved by stone columns, XV ICSMGE, Istanbul, Turkey, Proceedings, Vol 2, pp 1533-1536, Balkema, Rotterdam
4. Mulabdić, M., Sesar, S., Minažek, K. (2003). Measuring interaction in reinforced soil, Proc. XIII ECSMGE, Vol. 1, pp 843-848, Ed. Vaniček et al., Prague Aug.2003.
5. Mulabdić, M. Andričević, R. (2003). Use of solute flux approach to contaminant transport in aquifers, Proc. XIII ECSMGE, Vol. 3, pp 233-236, Ed. Vaniček et al., Prague Aug.2003.
6. Mulabdić, M. (2004). Hrvatska iskustva u primjeni suvremenih in situ ispitivanju tla, Savjetovanje Slovenskog geotehničkog društva, Rogaška Slatina, 2004, pozivno predavanje

### 2.5 Recent papers on course subject

1. Mulabdić, M. i Brunčić, A. (2000.). Prilog analizi primjene dilatometra Marchetti, Građevinar, Vol 52, No. 1, pp 9-17
2. Miklin, Ž., Mulabdić, M., Terzić, J., (2000.). The application of the CPTU method for the determination of soil characteristics; a case study on the "Danube-Sava" canal). Zbornik radova, 2. Hrvatski geološki kongres, 17-20 May 2000. Cavtat- Dubrovnik, pp 683-687.
3. Mulabdić, M. i Glavaš, T. (2000.). Određivanje konzistentnog stanja tla, Građevinar Vol. 52, 12.2000.
4. Mulabdić, M., Sesar, S., Minažek, K. (2003). Measuring interaction in reinforced soil, Proc. XIII ECSMGE, Vol. 1, pp 843-848, Ed. Vaniček et al., Prague Aug.2003.
5. Mulabdić, M. Andričević, R. (2003). Use of solute flux approach to contaminant transport in aquifers, Proc. XIII ECSMGE, Vol. 3, pp 233-236, Ed. Vaniček et al., Prague Aug.2003.

### 2.6 Memberships

Croatian Soil Mechanics and Geotechnical Engineering Society  
International Soil Mechanics and Geotechnical Engineering Society  
National Technical Committees for Geotechnics (TO 182) and Geosynthetics (to 221)

## 2 Lecturer

### 2.1 General data

| Name and surname          | E-mail address  | Web page |
|---------------------------|---|----------|
| <b>VLADIMIR PATRČEVIĆ</b> | <b><a href="mailto:vladimir.patrcovic@zg.htnet.hr">vladimir.patrcovic@zg.htnet.hr</a></b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>ASSOCIATE PROFESSOR</b>  | <b>17. 07. 2001.</b>     |

### 2.3 Curriculum vitae

He has borne 1946 in the Zagreb. Nationality of Croatia. Has graduated 1972 on the Faculty of Civil Engineering of the University Zagreb on the hydrotechnical department. Graduation thesis had been from hydrology. The academic degree of master of technical sciences acquires 1980 on the Faculty Of Civil Engineering of the University Zagreb. The academic degree of doctors of technical sciences acquires 1995 on the Faculty Of Civil Engineering of the University Zagreb, too. In the academic vocation Associate professor for the area of civil engineering, scientific disciplines of applied hydraulics, for the course hydrology on the Faculty of Civil Engineering in the Osijek, was chosen 2001 years. Has announced the 30 works, whereof are 24 in the category of the scientific and 6 in the category of professional works. From 1990 to 1995 had been the main researcher on the scientific research project financed from the Ministry of science of Republic Croatia. From 2002 he is leader and main researcher on scientifically-research project financed from the Ministry of science of Republic Croatia and Croatian Waters, Zagreb. He is the permanent reviewer of international magazine " Water International " which has published IWRA  
He has totally the 31 years of employment.

### 2.4 Recent papers (since 2000)

1. Patrčević, V.; Petraš, J. (2000): Utjecaj digitalne tehnologije na unapređenje hidroloških mjerenja. GRAĐEVINAR br. 2, veljača 1999., 151-158, Zagreb
2. Patrčević, V.; (2000): Recharge Groundwater with Vertical Hydrologic Processes. Annual Meeting and International Conference of the American Institute of Hydrology. Research Triangle Park, North Carolina.
3. Patrčević, V.; Maričić, S.; Mijušković-Svetinović, T. (2003): Investigation Vertical Water Balance Alluvium of the River Drava. VIII. International Symposium on Water Management and Hydraulic Engineering, 313 – 320, Podbanske, Slovakia,
4. Maričić S.; Mijušković-Svetinović T.; Patrčević V. (2004): Design Storm for Osijek's Urban Drainage; XXII<sup>th</sup> Conference of the Danube Countries on Hydrological Forecasting and the Hydrological Basis of Water Management, , Brno

### 2.5 Recent papers on course subject

1. Patrčević, V. (1996): Hydrology investigations on the river basin Drava. XVIIIth Conference of the Danube Countries on Hydrological Forecasting and Hydrological Bases of Water Management, volume 2, 61-69, Graz. (WMO)
2. Patrčević, V. (1996): Hydrology investigations to establish flood waters from the currents of the river. 1st International Conference on New/Emerging Concepts for Rivers, Rivertech'96, volume 1, 464-467, Chicago. (IWRA)
3. Patrčević, V.; Maričić, S. (1999): Gibanje vode u prirodi-značenje i istraživanje. II Hrvatska konferencija o vodama., 257-266, Dubrovnik. (UNESCO-IHP, Ministarstvo znanosti i tehnologije, Državna uprava za vode, Hrvatske vode)

### 2.6 Memberships

|  |
|--|
| International Water Resources Association (IWRA) |
|--|

## 2 Lecturer

### 2.1 General data

| Name and surname    | E-mail adress   | Web page |
|---------------------|---|----------|
| <b>JOSIP PETRAŠ</b> | <b><a href="mailto:jpetras@grad.hr">jpetras@grad.hr</a></b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>PROFESSOR</b>            | <b>October 15, 2002</b>  |

### 2.3 Curriculum vitae

Born in 1944 in Virovitica, and there finished primary and secondary school. Croat by nationality. Graduated in 1969 on the Faculty of Civil Engineering University of Zagreb. Since 1969 until 1978 employee of Sava Directory in Zagreb, working on different hydrotechnical designs and co-ordinating flood defence in 1973, 1974. In that period spent several months in Iran as an expert for flood protection system. Since 1978 employed as a full time professor on the Faculty of Civil Engineering University of Zagreb. Master degree got in 1980, and PhD degree in 1986 at the same institution. Title of doctoral thesis was "New approach to the river regulation considering water management, social and economic components". Until today published 83 papers. Leading and collaborating on the 7 scientific projects. Lecturing on the faculties in Osijek, and Rijeka. Mentor: 23 diploma thesis, 6 master thesis and 2 doctoral thesis. In the periods 1980-1984 co-ordinator of postgraduate hydrotechnical course.

### 2.4 Recent papers (since 2000)

1. Petraš, J., Marušić, J.: Prijedlog metodološkog pristupa izradi vodnogospodarske osnove. 2. Hrvatska Konferencija o Vodama, Dubrovnik 1999., Zbornik radova, str. 495-504
2. Petraš, J. Holjević, D., Plišić, I. : Possibilities to Estimate Soil Erosion Intensity and Sediment Transport by GIS Technology Application; 1st Int. Yellow River Forum on River Basin Management, China, October 21-24, 2003., Proc, p 421-431
3. Petraš, J., Kunštek, D. : Primjena informatičke tehnologije u parametarskom modeliranju otjecanja; 1. simpozij Računarstvo u graditeljstvu, GF Zagreb, 4.-6. prosinca 2003., Zbornik radova - str. 321-329

### 2.5 Recent papers on course subject

1. Primjena informatičke tehnologije u parametarskom modeliranju otjecanja; 1. simpozij Računarstvo u graditeljstvu, GF Zagreb, 4.-6. prosinca 2003., Zbornik radova - str. 321-329

### 2.6 Memberships

Member of Editorial board of journal *Hrvatske vode* and active member of 8 national and 3 international associations

## 2 Lecturer

### 2.1 General data

| Name and surname        | E-mail adress   | Web page |
|-------------------------|---|----------|
| <b>VLADIMIR SIGMUND</b> | <b><a href="mailto:sigmund@gfos.hr">sigmund@gfos.hr</a></b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Professor</b>            | <b>02.07.2002.</b>       |

### 2.3 Curriculum vitae

Born on 04. October, 1956. in Banja Luka. He graduated and received his M.Sc. from the Department of Civil Engineering, University of Zagreb in 1980. and 1985 respectively. At the Department of Civil Engineering, University of California, Berkeley, USA and at the International Institute of Seismology and Earthquake Engineering, University of Tsukuba, Tsukuba, Japan he was a visiting research scholar in 1982 and 1984 respectively. On his Ph. D. thesis he worked at the Department of CE, University of Illinois at Urbana-Champaign, USA under the Fulbright's Grant in 1988/89 and subsequently received his Doctor of Technical Sciences degree in 1989 at the Faculty of Civil Engineering, University of Sarajevo.

He worked at the Earthquake Engineering Research Institute in Banja Luka, Bosnia and Herzegovina from 1982 to 1988 at various posts (research engineer, research advisor, deputy director) and as its Chairman from 1989 to 1991. As an associate professor he lectured Structural dynamics at the University of Mostar from 1990 to 1991. During 1991 to 1996 he worked in a structural design bureau in Frankfurt/Main, Germany. At the University J.J.Strossmayer, Faculty of Civil Engineering he has been working from 1993. untill now as a full time professor.

He has been an UN expert (UN/Tarfo Agency) for earthquake resistant design of buildings from 1991 to 93, and is currently a Revisor for structural stability of masonry and r/c structures.

### 2.4 Recent papers (since 2000)

1. Sigmund V., Guljaš I., Bošnjak M., In-plane stiffness of the Prusic vaults, IABSE Colloquium "Saving buildings in Central and Eastern Europe", Berlin, 4.-5.6.1998 IABSE Report Volume 77
2. Sigmund V., Herman K., Dynamic characteristics as indicator of structural integrity, IABSE Colloquium "Saving buildings in Central and Eastern Europe", Berlin, 4.-5.6.1998, IABSE Report Volume 77
3. Sigmund V., Herman K., Sigmund, D., Experimental and Analytical Investigation of Sandwich Panels, IABSE Symposium, "Structures for the future-The search for quality", Rio, 1999., IABSE Report, Vol. 83.
4. Herman K., Sigmund V., Stability Studies of Water Towers' Vertical Flanges, IABSE Symposium, "Structures for the future-The search for quality", Rio de Janeiro, 1999., IABSE Report, Vol. 83.
5. Sigmund V., Brana P., Herman K., Two methods for estimating nonlinear characteristics of r/c frame members, the Third Japan-Turkey Workshop on Earthquake Engineering, 21.-25.02.2000, Istanbul, Vol. 1.
6. Guljaš I., Herman K., Sigmund V.: Testing of fracture mechanical parameters in concrete by means of wedge splitting test, XX International Congress of Theoretical and Applied Mechanics, Chicago, 09. 2000
7. Sigmund V., Guljaš I., Brana P., Zovkić J., Pre- and Post-Test Numerical Modeling of the RC Wall Nonlinear Seismic Response, International Symposium, University of Pécs, 31.05–1.06.2002, Proceedings Vol. 1.
8. Sigmund, V., Sigmund, D., Zovkić, J., Calculation models of three layered «sandwich» panels", IV ICCSM, Bizovac, 18-20.09.2003.

### 2.5 Recent papers on course subject

1. Sigmund V., Yoshimura M., Okamoto S., A SDOF Model to Analyze Earthquake Response of a Full Scale VII Story Structure, 17. Joint Meeting of US-Japan Panel on Wind and Seismic Effects, UJNR, Tsukuba, 1985.
2. Sigmund V., Comparisson of Elastic and Inelastic Methods for Evaluation of Expected Drifts During EQ, Proceedings of the IX ECEE, Moskva, 1990. Vol. 2.

### 2.6 Memberships

Member of the Croatian society of Mechanics, Croatian society of structural engineers, Croatian chamber of engineers, International association of brdige and structural engineers and Earthquake Engineering Reaserc Institute.

## 2 Lecturer

### 2.1 General data

| Name and surname           | E-mail adress   | Web page  |
|----------------------------|---|---|
| <b>VLADIMIR SKENDROVIĆ</b> | <b><a href="mailto:yskendrovic@worldbank.org">yskendrovic@worldbank.org</a></b> | <b><a href="http://www.worldbank.hr">www.worldbank.hr</a></b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Assistant Professor</b>  | <b>September 2003</b>    |

### 2.3 Curriculum vitae

Born on 4 Dec 1940 in Zagreb. High school graduated with the highest mark in 1959 in Zagreb and in the same year was enrolled in the Civil Engineering School of the AGG Faculty at the University of Zagreb where he graduated in 1964 the hydroengineering study. He got his MD in transport engineering in 1984 at the University of Zagreb and his PhD in 1987 at the same University. Since 1964 he has been working on numerous project in the country and abroad. In 1991, he was selected on the basis of an open international competition and appointed as United Nations Technical Advisor for infrastructure and was working until the end of 1998 with the United Nations Department of Economic and Social Affairs based in New York. From 1999 to the end of 2002 he was serving first as project coordinator and later as Country Manager of the World Bank in Croatia. Since 2003 he has been employed by the Faculty of Civil Engineering at the University of Osijek as Assistant Professor. He has been lecturing at the university level since 1979. He is fluent in English and German.

### 2.4 Recent papers (since 2000)

1. Vukmir, B., Skendrović, V.: "Koncesije i ugovaranje BOT projekata", knjiga, Hrvatski savez građevinskih inženjera, Zagreb 1999. 236 stranica.
2. Skendrović, V.: "Financiranje infrastrukturnih projekata", Zbornik Sabora Hrvatskih graditelja 2000, Cavtat 2000., 273-286.
3. Skendrović V.: "Infrastructure Project Planning and Financing", Key-note paper, 2<sup>nd</sup> SENET International Conference on Project Management, Cavtat, 2002. pp. 364-374
4. Skendrović, V.: "Uloga međunarodnih financijskih institucija u financiranju prometne infrastrukture u Hrvatskoj", Zbornik Sabora Hrvatskih graditelja, Cavtat 2004.
5. Medanić, Pšunder, Skendrović: "Financijski management u graditeljstvu", knjiga, Građevinski fakultet u Osijeku, prepared for press.

### 2.5 Recent papers on course subject

1. Skendrović: znanstvenog projekt 2-11-193 "Unapređenje autonomne građevinske regulative". Ministarstvo znanosti i tehnologije Republike Hrvatske, 1991.
2. Skendrović, V.: "O nekim terminima u građenju", Građevinar 41 (1989) 9, 433-437;
3. Skendrović, V., Simić, V.: "Unapređenje građevinske regulative", Glasnik Privredne komore Jugoslavije, Beograd, 1989, brojevi 12, 13, 14, 15 I 15, stranica 52;

### 2.6 Memberships

New York Academy of Science, New York; International Association of Project Management, Zurich; CIB (International Organization for Research and Information in Construction) Working Commission W065, Rotterdam; Croatian Association for Project Management, Zagreb;

## 2 Lecturer

### 2.1 General data

| Name and surname    | E-mail adress         | Web page |
|---------------------|-----------------------|----------|
| <b>LIDIJA TADIĆ</b> | <b>ltadic@gfos.hr</b> |          |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Assistant professor</b>  | <b>March 12, 2002</b>    |

### 2.3 Curriculum vitae

I was born on June 3, 1962. I have finished Primary and Secondary school in Osijek and graduated in 1986 on Faculty of Civil engineering University of Zagreb. In the period 1986 -1991 I was working as a designer of surface and subsurface drainage systems in the Vuka River Water Management. Since 1992 until today I am at the Faculty of Civil Engineering University J.J. Strossmayer in Osijek. During 1989 I have attended International Land Drainage Course in Wageninge, The Netherlands. I got Master degree in 1996, and PhD degree in 2001, all in the field of hydrotechnics. Title of my PhD thesis was Analysis of indicators of sustainability relevant for the water management of Karašica and Vučica catchment area. Last few years I am the lecturer of Land drainage and Fluid mechanics. I have published more than 20 professional and scientific papers on conferences and journals. I won two annual awards ( for master and doctoral thesis) for the water research. Since 2002 I am the head of the Department for hydrotechnics and environment

### 2.4 Recent papers (since 2000)

1. Tadić, L.(2000): Indicators of Sustainable Land Management, Zbornik 20. Konferencije podunavskih zemalja, CD, 1106-1111, Bratislava.
2. Tadić, L., Marušić, J., Tadić, Z.(2001): Sustainable Development of Land Management in Croatia, 19<sup>th</sup> Regional Conference of International Commision on Irrigation and Drainage, Brno-Prag
3. Tadić, L. (2002): Environmental Impacts of Land Drainage, 40<sup>th</sup> Anniversary of Pollack Mihaly College of Engineering-International Symposium, 368-376, Pečuh, Mađarska
4. Tadić,L.,Tadić,Z., Crnčan, I., Korov,J.,(2002): Analysis of Flood Frequency on the Area of Drava River Basin, 21<sup>st</sup> Conference of Danube Countries, (Proceedings on CD), Bucharest, Romania
5. Tadić, Z.,Bonacci, O., Radeljak, I.,Tadić,L (2003):Vodni režim Parka prirode Kopački rit, Zbornik 3. hrvatske konferencije o vodama, 941-950, Osijek
6. Tadić, Z.,Tadić, L.(2003):Wetland Management- Challenges and Prospective, International Conference of GIS and Remote Sensing in Hydrology, Water Resources and Environment (Proceedings on CD), Kina
7. Tadić, L.,Tadić, Z., Đuroković, Z.(2003): Suvremeni pristup hidrotehničkim melioracijama, Stručno-znanstveni skup Stanje i održivi razvoj hidromelioracijskih sustava u Hrvatskoj 28 i 29. listopada 2003, Hrvatske vode, Vol.11, broj 45, 381-388, Zagreb
8. Petošić, D., Tadić, L., Romić, D., Tomić, F.(2004): Drainage Outflow in Different Pipe-Drainage Variants on Gleyic Podzoluvisol in Sava River Valley, Irrigation and Drainage, Vol 53, No.1, 17-28

### 2.5 Recent papers on course subject

1. Tadić,L.,Tadić,Z., Crnčan, I., Korov,J.,(2002): Analysis of Flood Frequency on the Area of Drava River Basin, 21<sup>st</sup> Conference of Danube Countries, (Proceedings on CD), Bucharest, Romania
2. Petošić, D., Tadić, L., Romić, D., Tomić, F.(2004): Drainage Outflow in Different Pipe-Drainage Variants on Gleyic Podzoluvisol in Sava River Valley, Irrigation and Drainage, Vol 53, No.1, 17-28

### 2.6 Memberships

Croatian Hydrological Society, Croatian Society for Drainage and Irrigation, Croatian Society for Soil Science, American Society of Agricultural Engineers

## 2 Lecturer

### 2.1 General data

| Name and surname     | E-mail address  | Web page  |
|----------------------|---|---|
| <b>STJEPAN TAKAČ</b> | <b><a href="mailto:stakac@most.gfos.hr">stakac@most.gfos.hr</a></b> | <b><a href="http://www.gfos.hr">www.gfos.hr</a></b> |

### 2.2 Academic status

| Academic or teaching status | Date of last appointment |
|-----------------------------|--------------------------|
| <b>Professor</b>            | <b>10.07.2001.</b>       |

### 2.3 Curriculum vitae

He was born on December 19, 1941 in Golinci, near Donji Miholjac (Republic of Croatia). In 1962 he enrolled at the Faculty of Architecture and Urbanism in Sarajevo. From 1969 he worked as a designer at the design office "Arhitekt" Osijek. In 1970 he passed the state exam. From 1978 he worked in "Građevinski institut Zagreb" (Civil Engineering Institute Zagreb) – Institute for Materials and Constructions Osijek. In 1985 he finished Postgraduate studies at the Faculty of Civil Engineering in Zagreb: field - Theory of Structures; branch - Pure Theory of Structures. He successfully defended his doctoral dissertation "Contribution to Research of Wooden Plate Construction" in January 1992 at the Faculty of Civil Engineering in Zagreb. In 1993 he was appointed Assistant Professor (scientific field of Civil Engineering; branch – Supporting Structures). In February 1998 he was appointed Associate Professor (scientific field of Civil Engineering) and in July 2001 he was appointed Full Professor (scientific field of Technical Sciences). In 1993, 1998 and 2003 he became a certified reviewer for design control of "Mechanical Resistance and Stability of Timber Structures".

### 2.4 Recent papers (since 2000)

1. Takač, S., Bogičević, P.: Experimental Investigation of Joint Wood-Concrete Composite Structures Joined by Special Type Dowels, ICEUPT'99 (International Conference on Effective Utilization of Plantation Timber), "Timber and Wood Composites for the Next Century", Chi-Tou, Taiwan, ROC May 21-23. 1999,
2. Steffens, K., Takač, S., Delagić, A.: "Engineers in the Fight for the Survival of Nature" 6. Međunarodni znanstveni skup "Društvo i tehnologija '99, Opatija 28.-30.06.1999, zbornik Informatologija Vol.No.32(1999)
3. Takač, S., Bogičević, P.: Investigation of Highwall Carrier of Wood, IABSE Symposium Rio de Janeiro 1999, "Structures for the Future-The Search for Quality", Brazil, 25-27.08. 1999, Report 318 – 319, CD.
4. Takač, S., Plazibat-Lozančić, S., Bogičević, P.: Wood-Concrete Composite Structures Joined by Special Type Dowels, "1 st RILEM Symposium on Timber Engineering, Stockholm, Sweden, 13-15 September, 1999, RILEM Publications 255 – 262.
5. Takač, S., Lozančić, S., Bogičević, P.: "Gradnja drvenih mostova u Hrvatskoj" 7. Međunarodni znanstveni skup "Društvo i tehnologija '2000 Opatija 28.-30.06.2000, zbornik Informatologija Vol.No.33(2000) str. 190–193,
6. Takač, S., Delagić, A., Takač, B.: "The Influence of Living Conditions on Human Mental Health" International Conference Sustainable Building 2000, Maastricht 22–25.10.2000, the Netherlands, Proceedings 368-370.
7. Takač, S., Matošević, Đ., Bogičević, P.: Rheological Research of Sliding Modulus of the Wood-Concrete Connection, "IABSE, AIPCE, IVBH CONFERENCE LAHTI 2001, Innovative Wooden Structures and Bridges, Lahti, Finland, 29-31 kolovoz 2001, IABSE REPORTS – RAPPORTS AIPCE – IVBH REPORTS str. 495 – 500.
8. Takač, S., Matošević, Đ., Bogičević, P.: Numerical modeling of wood-concrete composite structures joints, International RILEM Symposium, Joints in Timber Structures, Stuttgart 12-14 September 2001, RILEM Proceedings PRO 22 str. 273 – 281.
9. Takač, S.: Drvo sirovina budućnosti, Međunarodni znanstveni skup "Društvo i tehnologija '2002 Opatija 28.-30. lipnja 2002, zbornik radova, Rijeka, 2002, str. 92 – 95,
10. Takač, S.: Građenje lijepljenim lameliranim drvetom, Međunarodni znanstveni skup "Društvo i tehnologija '2003 Opatija 28.-30.06.2003, zbornik radova, Rijeka, 2003, str. 80 – 84, Conference Paper.
11. Takač, S.: The Mental Health of People Living in Urban Conditions in the Slavonia and Baranya, 2<sup>nd</sup> International Symposium ILCDES 2003, Kuopio - Finland, 1.-3.12.2003, Symposium Proceedings.507–512.

### 2.6 Memberships

IABSE., HR. SAVEZ GRAĐ. INŽENJERA, Komore građevinara, Udruge revidenata

## 2 Lecturer

### 2.1 General data

|                        |   |   |
|------------------------|---|---|
| Name and surname       | E-mail adress   | Web page  |
| <b>NINOSLAV TRUHAR</b> | <b><a href="mailto:truhar@gfos.hr">truhar@gfos.hr</a></b> | <b><a href="http://www.gfos.hr/~truhar">www.gfos.hr/~truhar</a></b> |

### 2.2 Academic status

|                             |                          |
|-----------------------------|--------------------------|
| Academic or teaching status | Date of last appointment |
| <b>assistant profesor</b>   | <b>08.05.2001.</b>       |

### 2.3 Curriculum vitae

04.05.1963 born in Osijek (Croatia)  
1969-1977 elementary school in Darda (Croatia)  
1977-1981 high school in Osijek  
1981-1982 army service  
1982-1987 graduated on Faculty of Education, University of Osijek  
1989-1991 post graduate studies in Novi Sad (Serbia and Monte Negro)  
1993-1995 post graduated studies at the Faculty of Mathematics and Natural Sciences, University of Zagreb (Croatia)  
15.12.1995 graduated with M.S. thesis "Perturbations of Invariant Subspaces" at the Faculty of Mathematics and Natural Sciences, University of Zagreb  
10-12 1997 visiting researcher, The Pennsylvania State University, State College, PA, SAD  
03.05.2000 graduated with Ph.D. thesis "Relative Perturbation Theory for Matrix Spectral Decompositions" at the Faculty of Mathematics and Natural Sciences, University of Zagreb  
1999-2001 post-Ph. D. research at University of Hagen, Germany  
1988-2001 assistant at the Faculty of Civil Engineering, University of Osijek  
2001- work as the assistant professor at Department of Mathematics and the Faculty of Civil Engineering, University of Osijek  
2003- head of Department for Fundamental subjects and foreign languages at the Faculty of Civil Engineering

### 2.4 Recent papers (since 2000)

1. N. Truhar i I. Slapničar, Relative Perturbation Bound for Invariant Subspaces of Hermitian Matrix, Glasnik Matematički, Vol. 35, No. 2:221--232 (2000) .
2. I. Slapničar i N. Truhar, Relative Perturbation Theory for Hyperbolic Eigenvalue Problem, Linear Algebra and Its Applications, 309:57--72 (2000).
3. N. Truhar i I. Slapničar, Relative Perturbation Bound for Invariant Subspaces of Graded Indefinite Hermitian Matrices, Linear Algebra and Its Applications, No. 301: pp. 171--185 (1999).
4. N. Truhar i Ren-Cang Li, A  $\sin^2 \theta$ -Theorem for Graded Indefinite Hermitian Matrices, Linear Algebra and Its Applications, No. 359(1-3):pp. 263--276 (2003).
5. I. Slapničar i N. Truhar, Relative Perturbation Theory for Hyperbolic Singular Value Problem, Linear Algebra and Its Applications, No. 358(1-3):pp. 367--386 (2003).

### 2.5 Recent papers on course subject

1. N. Truhar i I. Slapničar, Relative Perturbation Bound for Invariant Subspaces of Hermitian Matrix, Glasnik Matematički, Vol. 35, No. 2:221--232 (2000) .
2. I. Slapničar i N. Truhar, Relative Perturbation Theory for Hyperbolic Eigenvalue Problem, Linear Algebra and Its Applications, 309:57--72 (2000).
3. N. Truhar i I. Slapničar, Relative Perturbation Bound for Invariant Subspaces of Graded Indefinite Hermitian Matrices, Linear Algebra and Its Applications, No. 301: pp. 171--185 (1999).
4. N. Truhar i Ren-Cang Li, A  $\sin^2 \theta$ -Theorem for Graded Indefinite Hermitian Matrices, Linear Algebra and Its Applications, No. 359(1-3):pp. 263--276 (2003).
5. I. Slapničar i N. Truhar, Relative Perturbation Theory for Hyperbolic Singular Value Problem, Linear Algebra and Its Applications, No. 358(1-3):pp. 367--386 (2003).

### 2.6 Memberships

Member Croatian Mathematical Society, British Computer Society, Canadian Mathematical Society