Postgraduate doctoral study programme in social sciences

Field of Information and Communication Sciences

KNOWLEDGE SOCIETY AND INFORMATION TRANSFER

Guide

University of Zadar
Upon completion of the postgraduate doctoral study program Knowledge Society and Information Transfer students will have achieved the academic level of doctor of sciences (abbreviation PhD). The full title in the scientific area is Doctor of Social Sciences, field of Information and Communication Sciences.

I. INTRODUCTION

Postgraduate doctoral study programme Knowledge Society and Information Transfer is conducted in line with the adjusted teaching programme adopted by the Senate of the University of Zadar on its 4th session in the academic year 2013/2014 (held on January, 28th 2014), and the current generation of the enrolled students' lecture schedule published on the Department of Information Sciences1 website and on the Office for Postgraduate Studies2 website.

The program is carried out by the Department of Information Sciences. The Programme is taught in Croatian and English language.

The classes are taught by the University of Zadar professors from various departments along with guest lecturers from the following universities:

- Josip Juraj Strossmayer University of Osijek, Faculty of Philosophy (FFOS) and Faculty of Economics (EFOS)
- University of California Los Angeles, Department of Information Studies, Graduate School of Education & Information Studies, Los Angeles, Ca, USA (UCLA)
- University of Ljubljana, Faculty of Philosophy, Department for Library and Information Science and Publishing, Slovenia (FFLJ)
- Karl-Franzens-University of Graz, VESTIGIA – Manuscript Research Centre, Austria

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1 University of Zadar, Department of Information Sceinces, http://www.unizd.hr/Default.aspx?alias=www.unizd.hr/iz&.

Guest lecturers participating in doctoral schools and conferences, depending on the theoretical and research needs and interests of doctoral candidates, are: Professor Emeritus T. Saracevic (honorary PhD at the University Zadar), Professor D. Bawden (City University, London, UK), Distinguished Professor C. Borgman (UCLA), Professor Emeritus M. Buckland, Professor Emeritus P. Sturges, Professor S. Erdelez (University of Missouri, SAD), Professor C. Cool (City University of New York, Queens College, SAD), Professor Emerita C. Kuhlthau, Professor M. Kovač (FFLJ), Professor P. Južnić (FFLJ), Professor J. Hansson (LINNAE).

The purpose of this Guide for the postgraduate doctoral study *Knowledge Society and Information Transfer* is to introduce the doctoral candidates to the programme activities, candidates’ and professors’ rights and responsibilities, as well as with the procedures they may expect to encounter during their study. The Guide refers to laws, University of Zadar regulations and special rules, procedures and accompanying forms that may be found on the University of Zadar’s Office for Postgraduate Studies website. This Guide outlines the specifics pertaining to the Department of Information Sciences' *Knowledge Society and Information Transfer* study programme.

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II. PROGRAMME PURPOSE AND PRINCIPLES OF THE STUDY

STUDY PROGRAMME OBJECTIVES

The objectives of the postgraduate doctoral study programme *Knowledge Society and Information Transfer* encompass the following activities: encouraging doctoral candidates to engage in critical thinking in the field of information and communication sciences, providing knowledge sources needed for responsible and successful scientific work, enabling the doctoral candidates to acquire new knowledge and master the advanced skills needed for understanding the circumstances of origin, organization, preservation and usage of written heritage especially in regard to the influence of new technology on the development of knowledge society and the transfer of information. All objectives are to be achieved in line with the highest professional and ethical standards of scientific work in the field of information and communication sciences.

REASONS FOR THE INTRODUCTION OF THE STUDY PROGRAMME

The starting points for the introduction of the study programme are the need for:

- promoting the development of information and communication sciences as a scientific field
- development of teaching and research staff competencies in universities, institutes and other academic institutions
- strengthening the private and public sector scientific and research personnel’s competencies particularly in heritage institutions, publishing and bookselling, as well as in creative industries
- encouraging collaborative research between academic and, private and public sectors in order to encourage the development of the profession based on current knowledge and practices
- strengthening the competencies and competitiveness of scientific and research staff at both, national and international levels.

LEARNING OUTCOMES

Learning outcomes achieved by doctoral candidates upon the completion of the study programme should provide them the opportunities such as continuation of the scientific research, post-doctoral specialization and employment possibilities in public and private sector.

Upon completion of this programme the doctoral candidates will be able to:
understand and interpret theoretical concepts in the wider social sciences area, especially in the information and communication sciences field

establish and interpret theoretical frameworks and models in the field of information and communication sciences

interpret taxonomies and ontologies in relation to organization of information

interpret and apply ethical norms in scientific work and scholarly communication in the information age

understand and describe cognitive processes in searching, seeking and use of information (study of reading, history and sociology of reading and books, information literacy, etc.)

understand and interpret theories and models in the area of information needs and behaviour

understand the changes in publishing and bookselling industry, and interpret the scientific paradigms of publishing and bookselling

recognize, interpret and become able to systematically act in the area of organization, preservation and use of written heritage (issues in digitizing written heritage, local studies, multiculturality and interculturality, etc.)

expertly and independently use research methodology, especially in their own dissertation research.

PRINCIPLES OF THE STUDY PROGRAMME

The study programme is based on general and specific principles.

General principles are:

- openness toward modern achievements in the field of information and communication sciences and related fields
- respect for human rights
- respect for professional and research ethics
- promoting quality of research and scientific approach.
Specific principles are aligned with the University’s strategic documents and are reflected in promoting the idea of unique and modern university based on information and communication technology application and expert change management in academic education and research with the purpose of:

- initiating collaborative research projects
- providing conditions for systematic education of research staff
- creating conditions that will enable University of Zadar to become a powerful regional centre for interdisciplinary research in the areas of:
  - theory of information sciences
  - theory of organization of information, especially in old and rare materials with the purpose of its preservation and presentation and use in the online environment
  - information need and behaviour in various contexts and readers’ interests and habits of user groups of different age, ability or life circumstances
  - scholarly communication and research results assessment (bibliometrics/scientometrics/infometrics)
  - directions of development in publishing and bookselling in traditional and digital environment
  - development of research methodology in the field of information sciences.

The study programme is open toward student mobility. During the course of study students are encouraged to choose elective courses from graduate study programmes from partner institutions and from other postgraduate doctoral study programmes that are valuable for their research.
III. STUDY PROGRAMME ORGANIZATION

Department of Information Sciences Academic Council as a part of its executive responsibility established the Doctoral Studies Council and it proposes to the University Senate its programme study members, directors and deputies. Doctoral Studies Council includes the professors participating in the programme, the students, as well as the University representatives.

*Knowledge Society and Information Transfer* Doctoral Studies Council coordinates the efforts of the programme study regarding the teaching, scientific and procedural efforts by the professors, mentors (and co-mentors) and doctoral candidates. Doctoral Studies Council closely collaborates with the University’s Office for Postgraduate Studies where all administrative and organizational activities related to the implementation of the study programme are performed. *Procedures of the postgraduate doctoral studies* is the document that outlines the most common subjects and procedures of the programme implementation and procedures related to the study programme, student subjects and the process of acquiring the doctoral degree.

IV. STUDY PROGRAMME

PROGRAMME DESCRIPTION

The programme for the postgraduate doctoral study *Knowledge Society and Information Transfer* was developed by the Department of Information Sciences and it contains descriptions of:

- the purpose and objectives of the doctoral studies
- learning outcomes
- curriculum
- the contents of the individual courses
- responsibilities and duties of doctoral students, mentors and co-mentors.

Class schedule for the current academic year is published on the Department of Information Sciences and on the Office for Postgraduate Studies websites.

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Structured teaching is conducted in the first two semesters within the core classes and the classes in the selected module. Individual work and supervised work with the mentors (and co-mentors) is done within the elective courses, activities related to extracurricular research, writing dissertation synopsis and the doctoral dissertation.

During the first semester the doctoral candidates are introduced to the theory of information sciences and the research questions related to studying the knowledge society and information transfer, as well as the relevant methods for scientific research in the field of humanities and social sciences.

In the second semester the doctoral candidates choose classes from the three modules according to their own scientific interests: 1) Organization, preservation and the use of written heritage, 2) Information needs and readers’ interests and habits, and 3) Management of change in publishing and bookselling. While working on the selected modules it is expected that doctoral candidates follow relevant scholarly literature in a self-sufficient and critical manner, that they master the skill of recognizing and investigating the chosen research problems and that they choose the relevant research method accordingly. The doctoral candidates are also encouraged to choose courses from the other modules in order to broaden their understanding of the scientific field.

The doctoral candidates are expected to conduct their own independent research, manage research projects, to advance academically and to seek work as research assistants in institutions of higher learning and research institutes that employ research staff in the field of social sciences and, more precisely, information sciences, as directors of libraries and other memory institutions, and to work in planning, managing and evaluating information systems and networks in national and regional information institutions, in national and local government offices, national archives, national and university libraries and museum and documentation centres. It is expected that the doctoral candidates will, upon completion of their doctoral degrees, be able to continue their academic specialization in Croatia and abroad.

DURATION OF THE STUDY

Duration of the study programme is three years, or six semesters.

DURATION OF THE STUDY PROGRAMME

The duration of the study programme ensures that each doctoral candidate receives the maximum amount of study time which is regulated through a contract between the University and the doctoral candidate at the beginning of the study programme. This means that the provider of the doctoral study ensures its duration at least two
years after the scheduled completion of the study. The study programme can be attended as full time (doctoral candidates in academic and research institutions) or as part time (all other doctoral candidates, employed or unemployed).

Should the doctoral candidate not complete the study programme within six (full time students) or eight (part time students) years he or she will lose the doctoral candidate status. Continuation or completion of the doctoral study is regulated through the Regulations on postgraduate study at the University of Zadar.

V. ENTRY REQUIREMENTS AND CRITERIA

ENTRY REQUIREMENTS

Postgraduate doctoral study *Knowledge Society and Information Transfer* considers the applications from the following categories of students:

a) those who completed postgraduate master study, university undergraduate study or graduate study (at least 300 ECTS) in the field of Information and Communication Sciences

b) those who completed a different postgraduate scientific master study, university undergraduate or graduate study (at least 300 ECTS) provided that they have published papers dealing with information phenomena

c) those who have achieved grade point average in their postgraduate scientific master study (arithmetic mean), undergraduate study (arithmetic mean) or graduate study (weighted average) 3,5 or higher (students with lower grade point average can also apply only if they provide two recommendation letters from university professors)

d) those who have good knowledge of English language and one more foreign language (knowledge of English language is proven through certificates and knowledge of other foreign language is proven during the postgraduate study).

Applicants in the category b) are required to take difference exams where knowledge of socio-cultural determinants of information society and the ability to work in the
networked environment is tested. Additional difference exams may be required before the enrolment in to the third semester. Basic and special requirements are regulated in the Regulations on postgraduate study, and the criteria for the selection of candidates are determined through the study Programme.

**CRITERIA AND SELECTION PROCESS**

The study programme is designed for information specialists (librarians, archivists, curators, information intermediaries, communicologists, publishers, booksellers), pedagogues, psychologists, philosophers, sociologists and other specialists in the field of social sciences and humanities who do scientific work pertaining to development of the knowledge society and info-communication paradigm in science, education and culture as well as preservation and promotion of written heritage while directing their research interests toward implementation of scientific and academic career and pursuing doctoral degrees.

The basic criteria for selection of the candidates are: knowledge acquired during the graduate study (minimum grade point average 4,0 in relevant courses for the study), excellent knowledge of English language and passive knowledge of at least one more foreign language, communication skills and skills for working in the networked environment, all proven by submitting relevant documents.

Applicants will be selected in line with the following procedures:

- balanced representation of candidates with regards to their diplomas (goal: diversity of scientific fields)
- overview of completed elective courses as seen on grade transcripts or diploma supplements (goal: to gain insight into candidates' interests and prior knowledge)
- determining whether the candidates have published scholarly/professional papers and whether they participated in scholarly or professional conferences during their previous study (goal: ranking)
- determining whether there is a need for difference exams (goal: encourage candidates to learn more about the topics they have not studied during their graduate study).
VI. TEACHING PROCESS

STRUCTURE AND ORGANIZATION OF THE STUDY

Postgraduate doctoral study Knowledge Society and Information Transfer is six semesters long and it ends with the dissertation defence.

The study is organized and is continually coordinated with the European Credit Transfer and Accumulation System (ECTS). It consists of six content groups, or six point groups:

First point group: mandatory courses (30 ECTS) completed during the first semester of the first year. The goal of these theory and methodology courses is to introduce the doctoral candidates to the theory of information science and theory of organization of information as indispensable support for science, as well as with the methods and procedures in particular research fields, with research methodology, especially in interdisciplinary humanities, with issues of ethics in scientific work, especially in scholarly communication in networked environment.

Second point group: mandatory courses in the module (30 ECTS) chosen by the doctoral candidates according to their own research interests which will provide knowledge in the area that is especially important for writing the dissertation synopsis and the dissertation itself. Each doctoral candidate is required to earn minimum of 20 ECTS credits from the chosen module group, and maximum of 10 ECTS credits from the elective courses from the other modules.

Third point group: elective courses (10 ECTS) selected by the candidates according to their own academic interests. These courses can be replaced with extracurricular elective scientific activities.

Fourth point group: extracurricular elective scientific activities (20 ECTS) for activities related to publishing papers. The goal is for the doctoral candidate to independently, or in collaboration with the mentor (and co-mentor), publish original scientific and/or literature review, paper in a A1 and/or A2 publication or as a part of other scholarly activities (e.g. participation in doctoral summer school, presenting and subsequently publishing papers at scholarly or other professional conferences).

Fifth point group: writing dissertation synopsis under the mentor’s (and co-mentor’s) supervision (30 ECTS) and preparation for public presentation and defence of dissertation synopsis. The objective of the supervised work is to identify the scientific perceptions and issues in the specific field of interest leading the doctoral candidate toward final choice and preparation of the doctoral dissertation proposition (synopsis). Along with the learning about the subject of the doctoral dissertation these
efforts should afford the doctoral candidate to be able to follow the recent scholarly literature in the research area of interest.

**Sixth point group:** independent work under mentor’s (and co-mentor’s) supervision which is completed by writing and submitting doctoral dissertation within proscribed deadline (60 ECTS).

The date when the doctoral candidate fulfils requirements from all six categories is considered to be the date of the completion of the study programme.

Classes are held in the form of lectures, seminars and labs, while the practical work and field research is conducted in educational practice centres where cooperation is agreed in advance. All classes and modules of this study can be conducted in English.

Classes in elective modules are performed mainly in the context of thematically organized doctoral schools and conferences, while some mandatory and elective requirements are completed within conferences organized by the Department of Information Sciences.

**COUNSELLING SYSTEM AND STUDY PROGRAMME SUPERVISION**

In accordance with the provisions of the Regulations on postgraduate studies, the doctoral candidate should choose a mentor whose research activity guarantees that he or she will be able to supervise them in their doctoral research. Mentors’ responsibilities are to refer the doctoral candidate to the resources needed for the research, to hold consultations with the doctoral candidates and to help them along if they encounter difficulties. If the doctoral candidate has been appointed a co-mentor, his or her responsibilities in supervising the candidate in the research and writing the dissertation are identical to those of the mentor.

Doctoral candidates are encouraged to suggest to their mentors and co-mentors participation in conferences and/or doctoral schools outside of this study programme. In accordance with the Programme ECTS credits are awarded for active participation in conferences through presentations, workshop participation, synopsis or doctoral thesis presentation in PhD forums, etc.

Considering that the Department of Information Sciences staff research and development projects constitute the basis of this program, doctoral candidates are encouraged to contribute to such projects with their own research and through the choice of their dissertation subject.
VII. ADVANCEMENT TO THE NEXT YEAR OF STUDY AND THE COMPLETION OF THE STUDY

ENTRY REQUIREMENTS FOR THE FIRST SEMESTER AND FOR ALL THE SUBSEQUENT SEMESTERS

Entry requirements for the first semester of postgraduate doctoral study *Knowledge Society and Information Transfer* are described in detail in the Regulations on postgraduate studies as well as in open call for admission to the study. Doctoral candidates earn 30 ECTS credits in each semester, or 180 ECTS credits in sum for the three year study, which is the minimum requirement in order to be eligible for submission of the thesis for evaluation and defence.

Doctoral candidates enrol:

▶ **to second semester by** passing all the difference exams if required by the Doctoral Studies Council, attend lectures of all first semester classes, validating the semester and passing at least one of the classes (appropriate credit values are recorded)

▶ **to third semester by** passing all the exams from the first semester and validating the second semester (appropriate credit values are recorded), recording the second foreign language and submitting the document on acceptance of projected topic of the dissertation and of mentor (and co-mentor) selection

▶ **to fourth semester by** passing all other exams and by completing all elective classes from the third semester and validating the semester (appropriate credit values are recorded). Also, the doctoral candidate needs to have the mentor’s approval for submission and defence of the dissertation synopsis topic including the detailed research plan

▶ **to fifth semester by** passing all remaining exams and submitting proof of ECTS credits acquired through scientific endeavours outside of regular study programme, validating the fourth semester (appropriate credit values are recorded), and by defending the dissertation synopsis

▶ **to sixth semester by** submitting the mentor’s statement on completed consultation sessions and validating the fifth semester (appropriate credit values are recorded). During the sixth semester it is expected that the doctoral candidate continues to work with the mentor on completing the dissertation and to submit the mentor’s statement on completed consultation sessions.
For doctoral candidates who have earned a master’s degree in the pre-Bologna programs the study programme lasts three semesters and it is completed by the defence of the doctoral dissertation. During the fourth semester such doctoral candidates will be appointed a mentor (and a co-mentor), the dissertation topic will be approved and the candidate may prepare for the defence of the synopsis. The requirements for admission to the fifth semester are completion of the two difference exams: Information Seeking and Information Society, as outlined in the graduate programme of the Department of Information Sciences (for doctoral candidates who do not have a graduate degree in Information Sciences), the proof of 30 ECTS credits earned through scientific endeavours outside of regular study programme, as well as the synopsis defence. During the fifth and sixth semester doctoral candidates should write the dissertation in collaboration with the mentor (and a co-mentor) (60 ECTS).

**CRITERIA AND TRANSFER OF ECTS CREDITS**

Doctoral candidates choose elective classes based on their own scientific interest, the selected area of their research and through consultation with their mentors (and co-mentors). Doctoral candidates can choose the elective classes from the following:

- courses from the other modules in the Knowledge Society and Information Transfer programme
- elective courses from the Knowledge Society and Information Transfer programme
- courses from the graduate study at the Department of Information Sciences
- elective courses from the postgraduate and graduate studies at the University of Zadar and the partner universities.

Should a doctoral student decide to take a course form another postgraduate and/or graduate study programme, the Doctoral Studies Council will decide on the number of awarded ECTS credits based of the content and methods covered in the chosen course and on the ECTS evaluation practices in the study programme Knowledge Society and Information Transfer.

**PREREQUISITS FOR SUBMISSION OF THE DISSERTATION AND COMPLETION OF THE STUDY**

For the submission of the dissertation for the academic degree of doctor of science a doctoral candidate should:
Requirements for dissertation submission for doctoral candidates who have earned a master of science degree through pre-Bologna programs and who enrolled in the three semester study programme are to successfully defend the synopsis of the doctoral thesis, to earn 90 ECTS and receive the mentor’s (and co-mentor’s) written approval for submission of the dissertation, containing an originality check.

The procedure for dissertation evaluation, requirements and defence is in accordance with the rules and procedures that apply to all doctoral programs at the University of Zadar.

VIII. RESEARCH PROJECTS AND TOPICS AT THE DEPARTMENT OF INFORMATION SCIENCES

Postgraduate doctoral study programme Knowledge Society and Information Transfer is directly associated with the Department of Information Sciences staff research activities (projects, collaboration and exchanges, conferences, etc.). The programme is also associated with the research activities of visiting professors who teach in the programme or are mentors or co-mentors to the doctoral candidates.

RESEARCH PROJECTS

Projects that were current at the time of the launch of the study programme funded by the Croatian Ministry of Science, Education and Sport from 2007 to 2013:

- Scientific programme: Organization, interpretation and preservation of Croatian written heritage; programme director: professor Tatjana Aparac-Jelušić; projects within the programme:
  - Digital library of Croatian printed heritage (by 1800): Structural premises (122-2691220-3043) – lead researcher: assistant professor Z. Velagić

Current projects:

- “Development, publication and maintenance of national cataloguing rules (for library, archive, and museum resources)” Programme, 2014-2017; responsible organization: National and University Library in Zagreb, funding provided by the Croatian Ministry of Culture
- Digitization, bibliographic processing and analysis of textual materials from the Zadar and Šibenik area up to the end of the 19th century in Glagolitic, Bosnian Cyrillic and Latin alphabets, 2016; project director: assistant professor Marijana Tomić, funding provided by the Croatian Ministry of Culture
- Information Literacy Online – Developing Multilingual Open Educational Resources Reflecting Multicultural Aspects (ILO), 2016-2019; project funded by the EU funds (Erasmus+, K2); director: Stefan Dreisiebner, responsible organization: University of Graz; local director: associate professor Ivanka Stričević

DEPARTMENT OF INFORMATION SCIENCES CURRENT STAFF RESEARCH TOPICS

Department of Information Sciences staff research topics are in line with the University of Zadar Strategic program for scientific research in the field of social sciences, humanities and arts: 2015 – 2019:

The impact of the Semantic Web technologies on conceptualization of models, standards and rules for the description and access to heritage resources
- Scientometric analysis and mapping of information sciences in Croatia
- Croatian public library collections evaluation in the context of building a democratic society
- The role of public libraries in the information, cultural and technological dimensions of life in small and rural communities
- Quality evaluation in elementary school libraries
- Digital Humanities: digitization, bibliographic organization and research of old and rare materials
- Information needs and information behaviour of different user groups
- User friendly design of online library services
- Information literacy in the process of research and learning
- New paradigms of reading in the digital age
- Challenges and opportunities of Open Science
- The study of development trends of scholarly publishing
- Evaluation of the use of XML technology in publishing
- Bibliometric and altmetric approach to scientific impact
- Development of modular software for preparation and analysis of data
- The application of statistical models on analysis of co-author social networks
- Education in the field of information science in Europe: mobility and coordination of learning outcomes

DEPARTMENT OF INFORMATION SCIENCES STAFF NATIONAL AND INTERNATIONAL RESEARCH COLLABORATION

- Participation in national and international associations and networks
  - Digital Research Infrastructure for Arts and Humanities in Croatia (DARIAH-HR) (http://dariah.hr/en/home/)
  - International Centre for Archival Research (ICARUS) (http://icar-us.eu/)
  - ICARUS-HR (http://icar-us.eu/en/english-icarus-hrvatska/)
  - International Federation of Library Associations and Institutions (IFLA) (http://www.ifla.org/)
  - Croatian Library Association (HKD) (http://www.hkdrustvo.hr/, http://www.hkdrustvo.hr/en/)
Participation of the Department of Information Sciences staff in projects outside of the Department of Information Sciences

▶ Ministry of Culture. Cultural Heritage
(http://www.min-kulture.hr/default.aspx?id=6)
▶ Josip Juraj Strossmayer University of Osijek, Faculty of Economics. Creative Treasury, 2015- (project for popularization of science)
(http://www.efos.unios.hr/kreativna-riznica-2016/)

Scientific centres for excellence

▶ Scientific Centre for Excellence for Croatian Glagolitic Script
(https://zci.stin.hr/)

ORGANIZATION OF NATIONAL AND INTERNATIONAL SCHOLARLY CONFERENCES AND DOCTORAL SCHOOLS

▶ AKM: Archives, Libraries, Museums: Possibilities of Cooperation in the Global Information Infrastructure, 1997- (yearly seminar; the Department of Information Sciences is a co-organizer since AKM12, 2008)
▶ LIDA: Libraries in the Digital Age, 2002- (every other year since 2012-; the Department of Information Sciences is a co-organizer)
▶ Summer School in the Study of Old Books, 2009 (doctoral school)
▶ Summer School in the Study of Historical Manuscripts, 2011 (doctoral school)
▶ Summer School in User Studies, 2012 (doctoral school)
▶ International Conference on Publishing Trends and Contexts, 2013- (yearly conference and doctoral school)
▶ Conference and School on Records, Archives and Memory Studies, 2013 (doctoral school)
▶ PUBMET: Conference on Scholarly Publishing in the Context of Open Science, 2014- (yearly conference)
▶ International Symposium of Information Science - ISI 2015: Re-inventing Information Science in the Networked Society, Zadar, 2015 (Department of Information Sciences was a co-organizer)
▶ Conference and School on Authority, Provenance, Authenticity, Evidence, 2016 (doctoral school and conference)
▶ ISIC: the information behaviour conference: Information Seeking in Context, Zadar, 2016 (Department of Information Sciences was a co-organizer)
PUBLICATIONS PUBLISHED BY THE DEPARTMENT OF INFORMATION SCIENCES


- Proceedings from doctoral schools: