SW FUNCTIONAL REQUIREMENTS

E-Students Information System

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Marjan Gusev		Initial idea and drafting of e-Students information system
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CIRCULATION LIST

This document is intended only for participants of i-Know Project.

REVISIONS SUMMARY

Revision	Date	Author	Modified paragraphs and kind of modification
Draft.1.0	16/10/2010	Marjan Gusev	Initial idea and elaboration
Draft.1.1	26/11/2010	Ivan Chorbev	Electronic Student services
Draft.1.2	26/11/2010	Dejan Gjorgjevikj	e-Student Enrolment
Draft.1.3	10/12/2010	Marjan Gusev	Revision and unification of the document
Draft.1.4	12/12/2010	Ana Madevska Bogdanovska	Student Services and LMS
Draft.1.5	12/12/2010	Anastas Misev	Student Identification and Accounting System
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LEGAL NOTICE

This document is prepared in the scope of the Innovation and Knowledge Management towards eStudent Information System TEMPUS Project JPGR 511342 – iKnow.
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CONTENT

1   Document overview

1.1   Document Purpose and difussion

The document gives functional specifications for a student information system.
This document is distributed by mail to participants in the Tempus project iKnow.

1.2   Reference Documents

Ref.	Title	Document Id.	Edition
[1]	Закон за високото образование, ,,Службен весник на Република Македонија", број 35, 14 март 2008		
[2]	КОНКУРС за запишување студенти на прв циклус студии на студиските програми на Универзитетот „Св. Кирил и Методиј" во учебната 2010/11 година		
[3]	КОНКУРС за запишување студенти на втор циклус студии на студиските програми на Универзитетот „Св. Кирил и Методиј" во учебната 2010/2011 година		
[4]	ДОПОЛНИТЕЛЕН КОНКУРС за запишување студенти на додипломски студии на студиските програми на Универзитетот „Св. Кирил и Методиј" во учебната 2010/11 година		
[5]	Листа на екстерни и интерни предмети од државната матура потребни за пријавување за запишување на студиските програми на Универзитетот „Св. Кирил и Методиј" во Скопје		
[6]	К О Н К У Р С за запишување студенти на прв циклус студии во рамките на реализацијата на „Проектот 45" во учебната 2010/11 година		
[7]	Latest proposed changes of the Law for Higher Education		
[8]	Best practice: Croatian National AAI service for education: http://www.aaiedu.hr/		
[9]	GEANT Identity federations: https://rnd.feide.no/identity_federations/		
[10]	Europass CV web site		
[11]	European Credit Transfer and Accumulation System (ECTS) Site		
[12]	Правилник за студирање по КС на ПМФ		
[13]	Diploma Supplement		

1.3 Acronyms and abbreviations

Term	Definition
Registration	To participate in the entrance exam conducted by the University, the student must provide all the details about him. This process is called Registration.
Authentication	Confirmation of ones identity
Authorization	The function of specifying access rights to resources
RFID	Radio Frequency Identification
AAI	Authentication and authorization infrastructure
Identity provider	Home institution, responsible for managing user credentials for its own users (students, faculty, administration)
Resource provider	Owner of a resource that is shared and which access should be controled
QA	Quality Assurance
PM	Project Manager
STL	Software Teal Leader
TBD	To be defined

1.4 Scope

This document will consist of several sections identified as functional requirements, user requirements, system requirements, system design and finally software requirements specification.

- Functional requirements are specification of a document written by statements in natural language that define a function of a software system or its component. The purpose of this section is to provide a high-level functional description (FD) and to list the functional requirements definitions for the eEnrolment system implementation. It will be updated after user requirements are specified in more detail. Its main purpose is to describe the system functions to be satisfied and serves as a basis for a mutual understanding between the stakeholders. It also provides information on the proposed methods and procedures, and includes assumptions and constraints. As new functionality is conceived/implemented in the further phases, this section will be updated to describe those functions and integrate them into the system.

- User requirements are specification of a document written by statements in natural language plus diagrams of the services the system provides and its operational constraints. It is written for customers and should describe functional and non-functional requirements in such a way that they are understandable by system users who don't have detailed technical knowledge.

- System requirements are specification of a document realized by a process of gathering information about the proposed and existing systems and distilling the user and system requirements from this information.

- System design is a document used by system developers in order to define what is to be realized. It contains details of implementation, algorithms, database and system organization, interface specification etc.

Sources of information for system requirements include documentation, system stakeholders and the specifications of similar systems. The requirements themselves are the descriptions of the system services and constraints that are generated during the requirements engineering process.

This requirements specification document will address

- *Functionality* – What is the software supposed to do?
- *External interfaces* – How does the software interact with people, the system's hardware, other hardware, and other software?
- *Performance* – What is the speed, availability, response time, recovery time of various software functions, etc.?
- *Attributes* - What are the portability, correctness, maintainability, security, etc. considerations?
- *Design constraints imposed on an implementation* – Are there any required standards in effect, implementation language, policies for database integrity, resource limits, operating environment(s) etc.?

The main purpose of system requirements is to specify a document that can be used by three groups:

- those who design (system designers),
- those who decide (managers), and
- those who develop/realize (system developers).

2 General overview

2.1 Objective

The university information system should automate the overall business processes of the university. The system should organize student data, employees, study programs, various data about the educational process and the faculty's research and scientific work. The system should automate the work of the student service, human resources management, schedule of lectures, management of student payments on various grounds, distribution of resources (professors and classrooms), organization of online services for the students and various other activities.

The main objective of this project is to implement a Students information system. The integrated information system for the university ought to achieve numerous enhancements:

- Fast and efficient administration
- Quality of the services provided to the students
- Engagement of the faculty staff in administering the data and information
- Accurate and updated data for the University and the faculties
- High quality, continuous and instant access to the faculty and university data.

2.2 General overview

All rules related to the business logic should easily be defined without changes to the application (for instance min/max number of ECTS credits).

Every change made in the system by the users should be recorded – logged. The log can later be used to see who, when and from where made changes in the database. The system should have an intuitive user interface where a simple procedure with the fewest steps possible will enable completing the required tasks.

The user interface – the use of all components of the system by the: faculty members, associates, students and potential students should be only through a WEB interface. The WEB should use modern technologies that will bring fast response with small burden on the server by doing most of the validation process on the client side. All user forms should have fast access to on-line help, context dependent. The components used by the system administrator or office users can be implemented as standalone desktop applications or WEB applications. Additional possibilities for an additional web interface for small devices (mobile phones) should be planned.

2.3 Modules in the software

2.3.1 Module for enrolment

- Management of enrolment of students (for every level of studies)
- Management of candidates, ranking and completing the enrolment of new students
- Exchange of information with the Ministry of education

2.3.2 Module for personal records of students

- Photographing and issuing cards
- System for authentication
- Personal records for students

2.3.3 Module for study programs and schedules

- Defining student programs, courses, prerequisites and rules for studies
- Mapping of faculty staff to courses

2.3.4 Student activities module

- Enrolment in a semester and selection of courses

- Forming groups

2.3.5 Module for the administration

- Administration of faculties and accredited study programs
- Administration of members of the faculty
- Administration of classrooms, rooms and laboratories

2.3.6 Migration of existing data

- Preparing forms and specification of formats for migration of data from existing systems
- Correction and fine tuning of migrated data

2.3.7 Module for administration of academic results

- Administration of courses taken
- Completing semesters
- Administration of exams
- Administration of earned ECTS credits and grades from exams passed

2.3.8 Reporting module

- Issuing documents
- Issuing other papers
- Reports for the University management
- Reports for the Ministry of education and exchange of information with other systems

2.3.9 Module for other student activities

- Administration of completed student mobility cases
- Change of study program by students
- Submitting for a master thesis or a PhD
- Submitting for a diploma thesis

2.3.10 Module for Europass CV, Erasmus, ECTS, Diploma Supplement

- Administration of ECTS
- Issuing documents and assisting mobility
- Issuing other diplomas
- Assisting employment

2.3.11 Module for personal identification

- Identification (RFID or similar card)
- Authentication system

2.3.12 Module for study programs and schedules

- Equivalence of courses, modules and programs
- Schedule – mapping groups, rooms and teachers

2.3.13 Module for attendance and student activities

- Schedules for each student
- Attendance recording

2.3.14 Module for quality of the education

- Administration of polls
- Implementation of electronic log of completed classes
- Implementation of a system for complaints and compliments

2.3.15 Module for electronic payment and use of resources

- Administration of payments by the students
- Access control
- Administration of the use of resources (library, Internet, photocopying)
- Administration of the use of learning systems (LMS)

2.4 Users

The following users and groups are to be realized:

ID	User groups	Roles
[1]	Technical Administrator	Manages the software parameters Create and manage user accounts for other user groups
[2]	Office members	Work in the office for communications with students Provide administrative services for students Manage students data Coordinate work with faculty members and provide services
[3]	Faculty staff	Teaches Updates results from exams in the system Views reports for student enrolment in courses and attendance Update other data (diploma thesis results etc.)
[4]	Students	Apply for exams in the system Enlist for courses View their current status Submit for seminar thesis, diploma thesis etc.

2.5 Data that should be stored in the system

2.5.1 Students personal data

According to existing legal requirements, requests from statistical agencies and practical needs of higher education institutions, the student's personal data that ought to be stored in the database consists of the following parameters:

- Name and surname
- Fathers name
- Maiden name (for female students only)
- Sex
- Birth date
- Community and place of birth
- Country of birth
- Nationality
- Citizenship
- Permanent address
- Temporary address during the studies
- Social security number
- Phone
- E-mail
- Financial details of the tuition
    - o Type of tuition (state funded or private)
    - o Yearly amount
- Profession (personal and of both parents)
- Year of completion of the studies
- Style of studies (full/part time)
- Year of completing with lectures (for students before the introduction of the ECTS)
- Has the student changed the faculty or the program that he/she is enrolled in
- Source of income (using scholarships or credits, employment, parental support etc)
- The initial study program at the time of enrolment
- Previous education
    - o Name of the school
    - o Year of completition
    - o Grades average
    - o Serial number of the graduation certificate

2.5.2 Additional data related to the studies of the student

- List of courses (mandatory and elective) that he/she has taken in the past or is currently enrolled in
- Changes of elective exams that the student has made
- List of grades for the exams passed and ECTS credits earned for each course along with exam dates
- The program that student is enrolled in
- List of enlisted semesters with details
- Seminar thesis submitted by the student
    - o Titles
    - o Mentor name
    - o Course
    - o Serial number of the thesis

- o Grade
- o Date of acceptance/rejection of the seminar thesis
- o Date of submitting the final version
- Diploma thesis
  - o Course that the thesis is related to
  - o Name
  - o Mentor and members of the commission
  - o Date of public presentation
  - o Grade
  - o Graduation date
  - o Serial number of the certificate
  - o Serial number of the diploma
  - o Comments
  - o Diploma supplement
- Grade average during the studies
- Length of the studies
- Acquired ECTS credits
- Title achieved with graduation
- Financial implications
  - o Date of payment
  - o Amount
  - o Type of payment (tuition (for what year/semester), expenses for diploma thesis etc)
  - o Comment
  - o Serial number of document

2.6 Basic functionalities

Basic functionalities of the student information system are given as follows:

ID	Functionality	Description	Objective	Module	Users
[1]	Administration of students data	Enable administration or only preview of the students personal data. Data needed for reports, statistics, contacts and guidance during studies.	Insert/edit students personal and background data. Students can preview part of their data and update some of the information themselves.	Students management	Office members / Students
[2]	Administration of students enrolment details	Enable administration of the parameters of a student at the time of enrolment (initial programme, tuition size etc.)	Manage and maintain information for the details for the beginning of the studies of the student	Students management	Office members
[3]	Administration of the student semesters	Sign in new semesters for the student in question, change programmes, tuition group – amount. Close completed semesters	Keep track of the progress the student makes during the years and manage his/hers current status/programme/tuition.	Students management	Office members
[4]	Administration of students courses	Enter the student's choices for elective and mandatory courses for the signed semester in question. Calculate credits for the semester based on the courses chosen.	Manage the courses the student ought to attend in the semester. Control of overall credits earned during the semester. Implement control mechanisms for repetition of failed exams. Change of elective students.	Students management	Office members / Students
[5]	Administration of student exam applications	Enter student exam applications or manage student exam applications entered online.	Manage student's applications to pass exams. Students can apply for exams by themselves. Officers can make changes in the applications if needed	Students management	Office members / Students
[6]	Administration of student's exams	Insert or update grades achieved by the student on a particular exam. Review list of exams passed.	Manage student's exams.	Students management	Office members / Faculty
[7]	Administration of seminar	Insert or update details of the seminar thesis undertaken by	Manage student's seminar thesis.	Students manage	Office members /

ID	Functionality	Description	Objective	Module	Users
	thesis	the student		ment	Students
[8]	Administration of diploma thesis	Update details for the diploma thesis that the student works on	Manage diploma thesis	Students management	Office members / Students
[9]	Administration of exam sessions	Add new exam sessions when exams are scheduled	Manage exam sessions	Studies and courses	Office members
[10]	Administration of semesters	Create new semesters with appropriate list of activated courses eligible for taking. Join courses with professors for the semester in question	Manage semester details	Studies and courses	Office members
[11]	Administration of quotas and tuition prices	Inserting and updating tuition details for various quotas that students can enrol in, costs for different programmes and quotas.	Manage costs for studying	Studies and courses	Office members
[12]	Administration of courses in programmes	Make relations between programmes and courses that can be taken in the programme in question	Manage distribution of courses in programmes	Studies and courses	Office members
[13]	Administration of courses	Insert or update details for each course, ECTS credits, fall/spring semester, number of classes	Manage details for the courses	Studies and courses	Office members
[14]	Administration of programmes	Insert/update details for the study programmes that a student can enrol in (start year, bachelor/master/PhD level etc).	Manage programmes	Studies and courses	Office members
[15]	Administration of programmes revisions	Insert revisions of programmes	Manage revisions of programmes	Studies and courses	Office members
[16]	Administration of members of the faculty	Insert new employees, update details for the current employees / faculty members	Manage faculty members	Studies and courses	Office members
[17]	Diploma thesis report	Present a list of completed ongoing diploma thesis work	Review diploma thesis	Reports	Office members
[18]	Exams report	Present results from exams with various filtering options	Review exam results	Reports	Office members / Students / Faculty
[19]	Graduated report	Present list of graduated students	Review graduated students and various statistics	Reports	Office members
[20]	Elective courses report	Present a list of students per course per semester	Review students taking a particular course	Reports	Office members / Faculty
[21]	Master book	Prepare the report for printing	Exact columns and	Reports	Office

ID	Functionality	Description	Objective	Module	Users
		the master book requested by the ministry of education	details as requested by the ministry for all active and graduated students		members
[22]	List students per programme	Present list of students with various filtering options	Review students per programme, per semester, per year etc	Reports	Office members
[23]	Seminar thesis report	Present list of seminar thesis	Review seminar thesis	Reports	Office members
[24]	Administration of student mobility	Insert / update details for student exchange programmes the student has participated in.	Manage student mobility	Students	Office members / Students
[25]	Administration of Master thesis	Update details on the Master thesis the student is working on	Manage the student's master thesis	Students	Office members / Students
[26]	Issuing documents	Issuing various documents for the student (list of courses and grades, proof of enrolment, etc)	Easy generation of requested documents	Students	Office members / Students
[27]	Issuing news and announcements	Post news and announcement or mail bulk mails to students	Manage communication with students	Students	Office members
[28]	Administration of users of the system	Create and manage users and their access privileges	Manage users and access to the system	General data	Administrator
[29]	Administration of lookup data	Administration of cities, countries, municipalities and other general data used in various modules in the system	Manage lookup tables	General data	Administrator / Office members

The following is brief functional description.

2.6.1 The process of studies

When enrolling in a semester, the student must enlist in all mandatory courses planned for the semester in question. Additionally the student can choose elective courses for the semester. The total amount of ECTS credits the student can earn in a semester is limited to 35. With a special decision, the successful students (having a grade average greater than 8,5) a maximum of 40 ECTS credits per semester is allowed. In the process of enlisting for courses the student should cover the financial obligations depending on the number of courses (credits) in the semester. During the semester the student should attend the classes and successfully complete any additional lectures. With proper attendance of lectures, the student can complete the semester. After the semester is over and completed properly, the student can apply for an exam and pass the exam (complete the course).

The student can submit a diploma thesis if the number of credits earned through exams, practical training and additional facultative courses is greater than the minimum set for the program he/she is enrolled in.

Process of studing

Signing in a semester

{
25 < Number of credits < 35
}

Enlisting in mandatory and elective courses

The courses that are prerequisites ought to be taken/passed

Satisfied prerequisites?

No

Suggestion which courses ought to be taken

Yes

Completing financial obligations

Suggestion for problem solving

Appling for exams

«precondition»
{
The course should have been taken
regular attendance in class
attendance in laboratory classes (if any)
professors signature
the previous semester ought to be completed
}

No

Prerequisites satisfied?

Exams are not allowed to be taken

Yes

Passing exams

Completing financial obligations

The poll should be anonimus, but mandatory for each student!

Filling a poll for the studies

Completing a semester

Completing practical work (student praxis)

«precondition»
{
An appropriate amount of ECTS credits ought to be earned
the selection of a mentor is limited to a professor
where at least one course has been taken before
}

Submiting for a final thesis

«precondition»
{
An appropriate number of ECTS credits earned
acceptance of the thesis by the mentor / commision
completing financial obligations
}

Final thesis presentation

Continuation with studies

End of studies

3 Student enrollment process

Students are the main purpose of the existence and operation of every university. Students are being enrolled at the university in a process called admission. Student admissions are a vital part of any university's running because students are what keep university alive.

The main purpose of every admission process is to:

- Acknowledge that the prospective candidates do comply with the internal/external policy/rules/laws for specific study program enrolment
- Select the candidates who, (in its judgment,) will make the best students and become valuable professionals.
- Plan the resources needed for the education process according to the interests of the future students
- Record statistical data collected from the prospective students in order to use it in future management / educational / other decisions.

Student admissions are usually organized in the certain periods of the year and last for a certain predetermined period of time in which a certain process of submitting applications, candidate selection and final enrolment takes place. In this process, the candidates (prospective students) usually express their intention to continue their education in a certain area of study by submitting an application at a certain university accompanied by other documents and certificates that are to certify that they satisfy certain prerequisites, and to support their application in the process of candidate selection. The applications are then reviewed by administrative officers to ensure that all of the required information has been provided, from the form itself to the supplementary documentation, such as degree certificates. If any of the required information is missing, an administrative or an admission officer contacts the potential student and arranges for the delivery of the outstanding data. The completed applications are then forwarded to the admission officers that according to the university/faculty/department rules for candidate selection prepare the preliminary lists of the admitted and rejected candidates. The candidates are than given an opportunity to formally complain about the admission officers' decision. After the revision of complains, the admission officers prepare the final lists of the admitted students. The process continues for the admitted candidates by registering them at the university/faculty/department, filling additional enrolment forms, regulating financial issues, issuing the student an ID card, etc.

A poor admissions system can mean errors in the admission process that can result in wrong choice of the candidates, fewer candidates being admitted, lot of support personnel occupied by admission process during the admission periods and overly slow response time that dissatisfies the candidates and the university management.

3.1 Objective

The objective of this project is to design a web-based system that will support the university enrolment process (on-line university admission system). The intent of the system is to:

- Exchange information about results
- Provide grading system and selection methodology
- Realize electronic registration and application
- Realize complete pro-active customized feedback
- Reports to university management and Ministry of Education

The main objective of this project is to design a system that will automate the task carried out by different persons in the organization and performing the student admission process. Specific design and implementation details will be specified in future documents.

3.2 General Overview

The system is intended to be used by the prospective students (candidates for university enrolment), the admission officers and the support personnel both at the university and departments/faculties level, and other government institutions like the State Statistical Office and the Ministry of Education.

3.3 Scope

The aim of the proposed system is to automate the system, pre-checking the inclusion of all required materials and automatic ranking each student's application based on a number of criteria. The data used by the system are to be stored in a database. A web-based application is to be provided for the candidates that will enable them to register for enrolment, provide their details including all the details from the certificates that have effect in the ranking process. This will enable the process to be simplified and considerably quickened, making the jobs of the people involved, especially the university staff and admission officers easier and faster. The system can supports the current process but is meant to centralize it and make possible for the decisions to be made earlier and easier. The system should enable the future extension to almost fully paperless admission process including transferring the basic data of the candidates and their certificates in fully digital form (digitally signed) from other certificate providers (high schools).

3.4 Existing System(s)

This section explains the current situation with the enrolment process and procedures on the universities in the Republic of Macedonia. The process of admission of new students at the public universities is regulated by regulation from the university that is to be approved by the government (especially in the part of maximum number of students allowed to be enrolled on particular study programs and the scholarship). This regulation also prescribes the documents candidates should provide, the dates the documents are to be submitted to the University/Faculty admission office, by which date the results must be published by the University/Faculty. In general, in a single admission period a candidate can apply for a place on one Faculty only. However, the faculties often allow the candidates to apply on several study programs that are held at the same faculty in which case the candidate must appoint precedence.

No university has an integrated web-based system that can support the admission process. Most of them accept the forms and certificates of the prospective students in person or by mail. Some of them use some kind of internal isolated application to enter the candidates' data and to rank them and produce the list of accepted ones.

- *What problems does the current system have? Which of these problems do we solve?*
- *Limitations of the proposed system…*

No personal contact and support/consulting in the process of form filling and study program selection. A parallel help / support system tightly linked should be provided.

3.5 Benefits

The aim of the proposed system is to address the limitations of the current system. The requirements for the system have been gathered from the defects recorded in the past and also based on the feedback from users. Following are the objectives of the proposed system:

- Reach to geographically scattered students. One of the important objectives of the admission system is communicate with all the students scattered geographically.
- Reducing time in activities. Reduce the time taken process the applications of students, admitting a student, conducting the online examination, verify student marks, and send call letters to selected students.

- Centralized data handling. Transfer the data smoothly to all the departments involved and handle the data centralized way.
- Paperless admission with reduced manpower. Reduce the manpower needed to perform all the admission and administration task by reducing the paper works needed.
- Cost cutting. Reduce the cost involved in the admission process.
- Operational efficiency. Improve the operational efficiency by improving the quality of the process.

3.6 Goals

The main goal of the system is to automate the process carried out in the organization with improved performance and realize the vision of paperless admission. Some of the goals of the system are listed below:

- Manage large number of candidate details.
- Create candidate accounts and maintain candidate's data in an effective way
- View all the details of the students.
- Create the statistical reports.
- Enable the candidates to take proactive role in the process by entering their data in the system
- Provide the candidates with updates of the current status of the enrolment process

3.7 Users

The following users and groups are to be realized:

| ID	User groups	Roles
[1]	Administrator (ADM)	Manages all Faculty/study program data specifics of the enrolment process Create and manage user accounts for user groups 2-6
[2]	University admission commission (UAC)	Conducts the admission process Monitor and supervise the admission process carried out by Faculty / Study programme admission officers Views and analyse comments Analyses statuses and response times Analyses quality of service provided Views reports about FAQ Issues reports to the University management Issues reports to media / Ministry od Education
[3]	Faculty/Study programme admission officer(s) (F/SP PAO)	Receives and reviews complain requests Sends answers Prepares preliminary and admission lists Edits FAQ
[4]	Supporting personnel (SP)	Receives the forms and other documents/certificates from the applicants (in paper form) Checks if all requested documents are provided an the forms are properly filled and signed Keeps records of all received documents Enters data from the paper only applications (received by mail, special cases, translated documents, etc.) in the system
[5]	Ministry of Education (MoE)	View various statistical reports for applied / admitted candidates
[6]	State Statistical Office (SSO)	View various statistical reports for applied / admitted candidates
[7]	Applicant / prospective student (A)	Registers to the system Inputs personal details, fills application Fills details from his/her certificates (academic scores) Submits / prints application Views FQA Fills complain request View results

3.8 Basic functionalities

Basic functionalities of the eEnrolment system are specified as follows:

ID	Functionality	Description	Objective	User
[1]	Creating / managing accounts	The administrator should have opportunity to create and manage accounts for the other user groups (except applicants)	To create and manage the accounts for the other persons from the university involved in the enrolment process	ADM
[2]	Manage look-up tables	The administrator should have opportunity to manage the look-up tables used in the form filling process (list of municipalities, list of schools, …)	To manage the date that can appear in the application forms in an organized way	ADM
[3]	Manage study programmes, prerequisites and admission quotas	The administrator should have opportunity to manage the study programmes, prerequisites and admission quotas for every study programme	The admission quotas, accredited study programmes, dispersed study groups, prerequisites can change frequently	ADM, UAC
[4]	Manage points calculation, ranking and precedence rules	The administrator should have opportunity to manage: the way the points awarded to applicants are being calculated; the ranking rules; and precedence rules	Point calculation, additional assessment exams, interviews should be recorded. In case of multiple choice for study program selection (where allowed) certain precedence rules should be applied	ADM, UAC
[5]	Initiating enrolment process	Enables the administrator to initiate the process that starts with candidates registration and finishes with enrolment/rejection	Most of the other activities can be performed only while the enrolment is active	UAC
[6]	Applicant registration	Applicants register on the system by entering their e-mail. After the account activation the user can use the system	Applicants can register on the system before and during the application submission period	A
[7]	Filling application form	Applicants can enter all data requested by the application form in a web based interface and save them. Data includes all high school marks and graduation exam marks.	The applicant can recheck and correct the entered data before the final application submission.	A, F/SP PAO
[8]	Submitting the application	Applicants should print out a reference form with generated unique ID that is supposed to be submitted with the originals of the requested document and certificates to the admission office	The admission officer can view and check the consistency of the data entered by the applicant to the original documents. The data entered is later used in the ranking process.	A
[9]	Viewing preliminary	Applicants can view the list of all candidates that applied for the same study		all

ID	Functionality	Description	Objective	User
	results	programme		
[10]	Fill a complain form / request a revision	A candidate should be able to raise a complain about an error in his/her data as published	To allow the candidate to request correction of mistakes or revision of his academic/exam results by the admission commission	A
[11]	Edit application form	Editing one applicants form in order to correct mistakes	Enables the officer to correct a mistake in the candidate application	F/SP PAO, SP
[12]	Entering additional information in the application form	The system should enable entering of additional data in the application like results of additional exam	To enter data from additional exams	F/SP PAO, SP
[13]	Ranking the candidates	The system should be able to automatically rank all the candidates for every study programme	To produce list of accepted and rejected candidates	F/SP PAO, SP
[14]	Close the submission process and produce the list of candidates that have applied	The system should be able to produce the list of applied candidates that is to be published	Publication of results	F/SP PAO, SP
[15]	Production of the preliminary list of accepted and rejected candidates	The system should be able to produce the preliminary list of accepted and rejected candidates	Publication of results	F/SP PAO, SP
[16]	Production of the final list of accepted candidates	The system should be able to produce the final list of accepted and rejected candidates	Publication of results	F/SP PAO, SP
[17]	Produce various statistical reports for applied / admitted candidates	The system should produce various statistical reports for all candidates that have applied, for the accepted and rejected ones	Statistics reports	UAC, F/SP PAO, MOE, SSO
[18]	Online Counseling			
[19]	Audit log	The system should keep audit log with time stamp and user ID of that has made additional changes to the student application record once the application has been submitted		

3.9 Overview
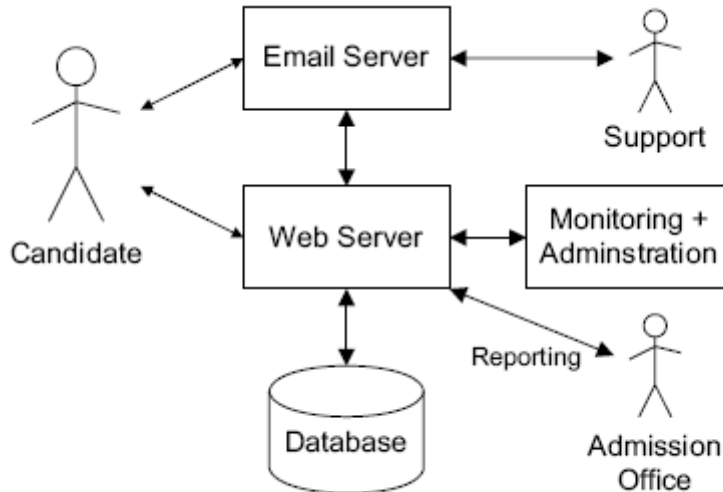
The following is brief functional description.

Certain activities in the enrollment process have to appear in strict chronological order.

3.9.1 Registration and Login System

Applicants will carry out their own registration, providing the system with a way to associate a user to their application. This will enable the system to display personalized information when the user logs in and certain information. Giving each student a unique ID will also allow the system to associate the user with the data entered in the system associated to his application file.

3.9.2 Application form filling

The system is supposed to enable entering all data that are requested for implementing the ranking and enrolment process as well as data requested by the SSO. This includes:

- Faculty / study programme(s) selection
- Type of studies applying on (full/part time) if offered
- Social security number (EMBG)
- Name and surname
- Parent name
- Sex
- Date and place of birth
- Nationality
- Citizenship
- Permanent address
- Municipality
- Phone
- E-mail
- High school results
- Graduation exam results
- Study programme(s)
- Precedence annotation (in case of multiple SP selection)

- Financial details of the tuition
- Type of completed education
- Previous education - Name of the school

3.9.3 Ranking the candidates

The maximum number of candidates that can be enrolled is predetermined. Certain number of best ranked candidates of certain nationalities does not count in this quota. Some special cases are also excluded from the admission quota. …

Administration Functions
How will the system be administered? Are there separate functions for an administrator? Is there any security built in to stop others using administrative functions? Passwords?

Error Handling
How errors should be handled should be stated. Identify the different types and reasons for the classification.

Security
Security considerations are an important part of any project. This section should detail possibilities of abuse of the system.

Along with error handling, the specification has to handle "the negative path". There is no point in having a system that does lots of good things if it also does lots of bad things.

Help
What type of help is to be provided?

Printing
Ensure any printing to be provided is stated.

Interfaces

User
This could be a chapter in its own right if it is a full definition. If it is deferred to the design specification stage, this should be stated.

Software
We may be interfacing to existing software. This should be stated, e.g. toolkits, back ends of existing packages. State versions. Do interface documents exist?

Boundary Conditions
It should be clear what are the extremes to be taken into consideration. These items may have come up. This will vary with different systems but it could be items such as number of users, size of forms, number of forms.

Constraints
All other constraints not specified under particular headings. For example: economic, political, technical, system, environmental, scheduling constraints.

Platforms
We should list which platforms we will be supporting. Name a reference platform or platforms plus appropriate operating system versions.

Internationalisation
Is this to be included in the product now or in the future?

Performance

Capacity

Response times

Portability
Although we may only be supporting one platform initially, we almost certainly will want to be able to port developments to other platforms. This should be stated here.

Expandability
State the likely expansion requirements. Some of the items may have been considered earlier in the document. These should be referred to from this section and any additional items put in.

Customisation
Are we allowing the user to customise the system? If so, what are we going to provide?

Support & Maintenance
Are any functions to be included to make maintenance and support easier, e.g. internal monitoring of traffic flows.

Configuration Management
How are we proposing to manage the various software versions?

Documentation
List the documents that will be produced. This could refer to the project plan if that exists and contains such a list, otherwise it should be stated here.

4   Student Identification and Accounting System

Establishment of sound AAI infrastructure is a key element for supporting any heterogeneous system with mass usage. The AAI infrastructure solves the problem of the users having multiple identities (user/password or other forms of identification) for each of the resources they would like to access. This problem is even greater when the users and the resources belong to different administration domains (institutions).

The basic AAI infrastructure consists of 3 basic elements: users, identity providers and resource providers. The main purpose of such infrastructure is to provide unique identification of all the involved users (students, faculty, administration) and their authorization to use the available resources. The infrastructure should be based on the following qualifications:

- The management of the user databases used for authentication will be done at the institutes responsible for the particular users (their home institutions)
- The management of the resource databases used for authorization will be done at the institutions owning the particular resources
- There will be no central repository, neither for users nor for resources (meaning that there will be no central responsibility for the users and resources, only for the operation of the infrastructure)

The AAI system will enable easy user mobility (both student and staff), which is in accordance to the current trends in education (Bologna declaration). The infrastructure enables authentication and authorization for usage of various resources, such as networks (fixed or wireless), network services (e-mail, ftp), web based applications (LMS, CMS), reference resources (libraries). It also enables integration with pan-European systems such as eduroam (wireless roaming), GEANT federated identities, etc.

The infrastructure should be build on open standards and protocols, enabling easy maintenance and expanding.

4.1   Objective

The objective is to design a robust authentication and authorization infrastructure. The intent of the system is to:

- Enable unique identification
- Support RFID and biometric identification
- Enable administration of personal files
- Provide authentication of each user by its home institution
- Provide authorization for university resources and services
- Send accounting reports to university management

The main objective of this project is to design a robust AAI infrastructure that will support all the elements of the new iKnow infrastructure. Specific design and implementation details will be specified in future documents.

4.2   General Overview

The system is intended to be used by the students, academic and administrative staff at all the levels (University, faculty, department) and all the resource providers outside of the University (libraries, etc).

4.3   Scope

The proposed infrastructure should cover many levels of user authentication and authorization. It will begin from the level of presence identification using RFID or other means of presence identification. The infrastructure will also enable secure authentication of users toward multiple heterogeneous resources (networks, networking services, web applications, libraries, etc), while distributing the responsibilities for the management of the

users/resources databases to the home institutions of the users (or institutions owning the resources).

4.4 Existing System(s)

At the moment, there is no such infrastructure established in Republic of Macedonia. There are smaller infrastructures at some of the Universities (for example UGD Stip), but they are local infrastructures. The current infrastructures have no international connectivity and visibility. The only example of international visibility is the eduroam infrastructure (which is in the process of establishment at UKIM – on 2 locations so far).

4.5 Benefits

The benefits of such system are multiple. Regarding the users, it will enable simple and efficient mechanism for their authentication and authorization for multiple, heterogeneous systems. From the point of view of the resource providers, it will simply the management and the allocation of the resources to the users. It will also enable user mobility within and between the universities. From the point of view of the educational authorities, there will be a central collection of the shared resources committed to the higher educations (identified by the member institutions and/or services).

4.6 Goals

The main goal of the proposed infrastructure is to provide simple, yet robust and secure mechanism for user authentication and authorization toward various shared resources. Some of the goals of the system are listed below.

- Enable unique identification
- Support RFID and biometric identification
- Enable administration of personal files
- Provide authentication of each user by its home institution
- Provide authorization for university resources and services
- Send accounting reports to university management

4.7 Users

The following users and groups are to be realized:

ID	User groups	Roles
[1]	Student users (STU)	Access various resources using single credentials Be identified for presence at lectures using RFID Authenticate and authorize in home and visiting institutions (mobility)
[2]	Faculty staff (FAC)	Access resources using single credentials Authenticate and authorize in home and visiting institutions (mobility)
[3]	Faculty administrations (ADM)	Manage the student and staff accounts using standard LDAP schemas Enable and revoke privileges
[4]	Resource administrators (RES)	Define access to their resources using standard LDAP schemas
[5]	University computing center (UCC)	Maintain and monitor the infrastructure Provide hosting for the AAI services for smaller membering institutions.
[6]	Faculty computing center (FCC)	Maintain the users/resource database (LDAP and associated servicer) Maintain the identities of the users (identity providers)

4.8 Basic functionalities

Basic functionalities of the AAI infrastructure are specified as follows:

ID	Functionality	Description	Objective	User
[1]	Establish AAI infrastructure	Establish the necessary infrastructure for supporting the AAI	Make the initial infrastructure	UCC
[2]	Maintain AAI infrastructure	Maintain the central point of the infrastructure, LDAP schemas, registry of member institutions, software repository.	Keep the infrastructure operational	UCC
[3]	Support the member institutions	Provide support to FCC to establish the identity providers and resource providers	Establish identity and resource providers	UCC, FCC
[4]	Manage users identities	Open accounts for students and faculty staff, manage levels of authorization, revoke accounts	Define the single user identity	ADM
[5]	Manage resource access	Define access rights for own resources with respect to user roles and responsibilities	Define the access policies	RES
[6]	Access student resources	Using single credential, access all the needed resources.	Simplify the access model to resources	STU
[7]	Access faculty resources	Using single credential, access all the needed resources.	Simplify the access model to resources	FAC
[8]	Presence identification	Using RFID or other means, identify physical presence of students	Presence identification	STU
[9]	Staff and students mobility	Access resources in visiting institutions using home identities	Enable roaming access	STU, FAC

4.9 Overview of the system

User
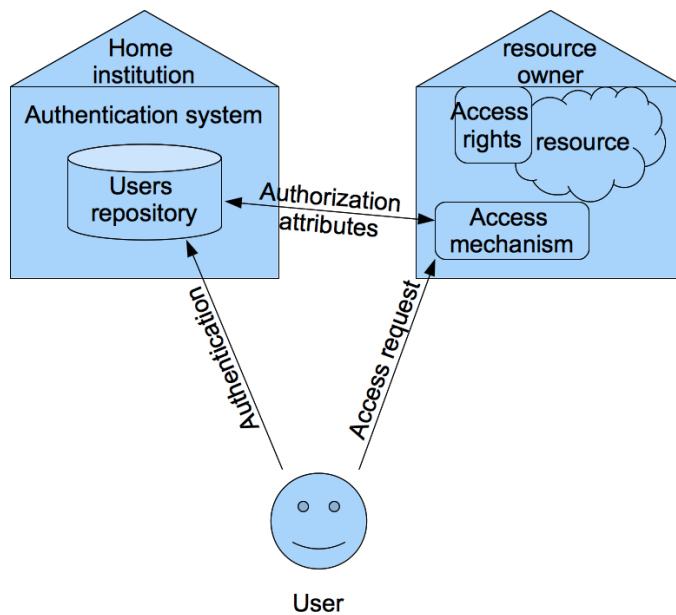
5 Student services and LMS

After the student has been enrolled with the process called admission, they can use the LMS and other pro-active tools at the University to register for a certain module / course. The LMS should be based on international open standards and on the newest educational principles.

5.1 Objective

The objective of this project is to design a web-based system that will support the university LMS that will enable easy and timely access to the eStudent services, and other **social networking infrastructure, collaboration tools, library access**. So, all of the mentioned parts will be part of the LMS on the university level.

The intent of the system is to:

- centralize and automate administration about the modules/courses
- use self-service and self-guided services
- consolidate training initiatives on a scalable web-based platform
- support portability and standards
- personalize content and enable knowledge reuse
- exchange information about results
- realize complete pro-active customized feedback
- reports to university management and Ministry of Education
- centralized data handling at 'index level' (access to the courses)
- reducing time in activities.
- betrer communication and knowledge-transfer (libraries, social networking infrastructure).
- Improving the learning process and communication with the students that learn similar courses, but are enrolled in different faculties.

5.2 General Overview

The system is intended to be used by the enrolled students, the teaching staff of the courses and the support personnel both at the university and departments/faculties level.

5.3 Existing LMS (s)

This section explains the current situation about the connection with the LMS process and procedures on the universities in the Republic of Macedonia.
The administration of the student's learning process at the university level at UKIM **is non-existing.**
No university in Macedonia has completely integrated web-based system that can support the LMS process. Usually it is done at the Faculty level or even on Department level.
Example – Faculty of Natural Sciences and Mathematics, Institute of Informatics uses the system Moodle for organizing most of the courses. It is directly connected with the Data base of students that are enrolled at the Institute of Informatics.

5.4 Benefits

The aim of the proposed LMS is to overcome the limitations because of its absence on the University level. The use of the central LMS on the University level will support one of the ECTS pillars by providing the horizontal transition between the University faculties, i.e. the students from different faculties could easily choose elective courses from the same University.

5.5 Users

The following users and groups are to be realized:
- Administrators - Vigorous support community
- Students
- Teachers / assistants

5.6 LMS - Basic functionalities

Basic functionalities of the University-level LMS are specified as follows:

Number	Feature Category	Feature
1	User-friendly, intuitive interface:	Connection to the Main Student System interface
2		Multiple interface languages (eng/macedonian)
3		Integrated contextual help system; complete user and administrator manuals
4		Designation of Faculty /Curriculum (Modul)/ Course
5		Administration of users and user groups
6	Management of the organization:	Management of resources
7		Management of Faculties (By names, levels, profiles, classes, subjects)
8		Scheduling (detailed schedule for each instructor/student)
9		Schedule creation and generation support
10		Management of curricula
11		Training results management – students' grades, results, activity
12		Interface Course management
13		WYSIWYG editor
14		Instant messaging (Chat)
16		Discussion forums associated with courses
17		Emil notifications (copies of forum posts, teacher feedback etc can be mailed in HTML or plain text)
18		Content moderation
19		Fine-grained access control (Global forums, Course forum, Forum for areas of interest)
20		Forum Subscribe (A feature to allow users to subscribe to entire forums, and receive notice whenever a new message is posted to the forum, instead, or in addition to, subscribing to individual threads)
21		Service to write mutual document within a given topic
61		Forum ratings
62		Automatic, customizable notifications

63		Miscellaneous reports
64		Ability to set up peer review between students for a course material
		Built-in Rubrics
		Group aware – small groups and other tools can interact (i.e. discussions)
69	Monitoring:	Student tracking sub-system (monitoring of online student activity)
70		User's history
71		Course attendance report
72		Report of the course's history
80	Configurable security policies:	Function oriented and data-oriented security
81		Each role is a collection of accessible functions
82		Users and user groups
83		Different levels of access: create, read, update, delete, attend, administer
84		Time limit of who is online and idle
86		Account is valid: forever, registration date + time period
88	Easy installation, backup, recovery and administration: Module Installer/Manage	Graphical tools for common administrative tasks
89		Task scheduling (backup, patching, content import)
90		On-line technical support
91		Module Installer/Manager
	Electronic Library	self access to publications
		access to electronic publications
		assistance and training to library users
		bibliographical guidance
		bibliographical instruments.

- Existing comprehensive online help resources, Vigorous support community

5.7 Social networking infrastructure – within the LMS

The social networking on University-level should be built as a service within the University LMS.

5.8 Collaborative tools – within the LMS

The Collaborative tools on University-level should be built as a service within the University LMS.

5.9   eLibrary access – within the LMS

An Electronic Library (eLibrary) should provide all of the resources that are available in a traditional library: books, magazines, encyclopedias, government information, and research materials. This service could be found 24X7 in homes, schools, and libraries, wherever there is an Internet connection. It would be useful to graduate students, postgraduate student or even to a life-long learner (in the future), The information from the eLibrary should be safe from the dangers of the Internet.

6 E-Assessment and learning management module

Assessment lies at the heart of the learning experience: how learners are assessed shapes their understanding of the curriculum and determines their ability to progress. At the same time, assessment and feedback form a significant part of practitioners' workloads and, with increased numbers, reduced budgets and higher learner expectations, continue to be a matter of concern for many institutions delivering higher education.

Assessment is a process in which examples of person's attitude are taken at particular time and they are evaluated. According to the evaluation of these examples, conclusions are made for the person's achievement, potential, intelligence, attitude or motivation. Different forms of assessment exist and each of them has different use. Besides the traditional summative and formative assessment, in the past several years newer types of assessment are becoming more popular, such as competence assessment, performance assessment, portfolio assessment and peer assessment. Compared to the traditional ones, they are more integrated and embedded in the learning context which requires higher level of student involvement in the assessment process. These types of assessments try to give an adequate answer to the ideas of a learning process where teaching, learning and assessment interact.

The assessment has two main purposes within further and higher education:

- The first reason is to assist learning. When looking at this area we must always strive to make the assessment relevant to the overall goals of the unit and to make our assessment part of the learning process.

- The second is to determine the effectiveness of the education system. Only with this can we as educators improve the education of our students. However we must be able to determine not only the overall learning but which areas are not effective and need modification.

Technology can support nearly every aspect of assessment in one way or another, from the administration of individual tests and assignments to the management of assessment across a faculty or institution; from automatically marked on-screen tests to tools to support human marking and feedback. Clearly, though, for technology-enhanced assessment to be effective, pedagogically sound developments need to be supported by robust and appropriate technology, within a supportive institutional or departmental context.

'Technology-enhanced assessment' refers to the wide range of ways in which technology can be used to support assessment and feedback. It includes on-screen assessment, often called e-assessment.

The broadest term which is used in literature when discussing assessment automation is computer assisted assessment. This term cover any use of computers in the process of assessing knowledge, skills and abilities of individuals

6.1 Objective

The objective of this module is to design a web-based eAssessment Management System which can be stand alone application or part of integrated Student Information System. This system will support the process of assessing student knowledge and providing feedback for student achievements during the learning process. The intent of the system is to:

- Enable management of course schedule
- Enable update of class activities, homework and project results
- Enable update of midterm and final exam results
- Enable evaluation of activities and assessment of knowledge
- Provide electronic access to academic results

The main objective of this project is to design a system that will automate the task carried out by different participants during the processes of assessing student knowledge.

6.2 General Overview

The system is intended to be used by the students and university staff, the university administration, and other stakeholders.

The system is a web based integrated IS. It should be accessible from public Internet network taking known techniques for online and protection of data.

6.3 Scope

The aim of the proposed system is to automate the process of assessing student knowledge. Special attention is put into creation of a system that can help realization of exams for cases where number of students is very big (several hundred on each exam), and in cases when each student is allowed to apply for an exam each month. The proposed system should be able to act as an independent system of testing with a lot of intelligence, applicable both for conventional and distance learning. The same system should be easily attachable to any larger Information System like Student Information System for example.

6.4 Existing System(s)

There are several systems for automatic assessment on the market, mainly as part of distance learning systems. However, there are independent software packages for computer based assessment, web based assessment or electronic assessment. Many of these systems are very comprehensive but most of them are stand alone applications without possibilities for interoperability, adaptability according to learner characteristics and possibilities for content reuse.

The system for electronic testing at the University "Ss Cyril and Methodious" - eTest, is a result of continuous development of concepts and software, which are used for conducting frequent assessments, on which more than 500 students take part. The original idea to create a system that can help realization of exams for cases where number of students is very big (several hundreds on each exam), and in cases when each student is allowed to apply for an exam each month, was expanded and an independent system of testing with a lot of intelligence, applicable both for conventional and distance learning was realized.

6.5 Benefits

The aim of the proposed system is to address the limitations of the current assessment process.

Some of the advantages that the e-assessment system should have are:

- immediate feedback to students,
- allows rehearsal and revision,
- immediate feedback to staff,
- evaluation of a course's strengths and weaknesses,
- can be linked to other computer-based or online materials.
- remote access and choice of time and place of assessment

The e-assessment system should be perceived as a longer term investment. While in the first year it won't save any time, in the second and third years of that material's life span we can expect saving considerable development and support time.

6.6 Goals

The main goal of the system is to automate the process of assessing student knowledge. Some of the goals of the system are listed below:

- Manage large number of candidate knowledge assessment details.

- maintain and exchange candidate's data with other systems or modules in an effective way
- View all the details of the students assessment history.
- Create the statistical reports.
- Enable the candidates to take proactive role in the learning process by assessing their knowledge
- Provide the candidates with feedback which can be valuable for the learning process itself

6.7 Users

The following users and groups are to be realized:

ID	User groups	Roles
[1]	Administrator (ADM)	Manages all setup data Create and manage user accounts for user groups 2-7 Create and manage courses, privileges and enrolment to those courses
[2]	University Administration (UA)	Views and analyse reports and data Analyses statuses and response times Analyses quality of service provided Views reports about FAQ Issues reports to the University management Issues reports to media / Ministry of Education
[3]	Faculty/Study programme Users (F/SP U)	Create and manage courses Create and organize sections in every course Create and manage assessment questions and possible answers Views and analyse results Analyses learning statuses and response times Analyses quality of service provided Issues reports to the University management
[4]	Faculty/Study programme admission officer(s) (F/SP PAO)	Manages students enrolment in courses
[5]	Ministry of Education (MoE)	View various statistical reports
[6]	State Statistical Office (SSO)	View various statistical reports
[7]	Student (S)	Take assessment, Learn online, Perform self-assessment, Check results, Change personal information, Communicate with other students

6.8 Basic functionalities

Basic functionalities of the eAssessment Management System are specified as follows:

ID	Functionality	Description	Objective	User
[1]	Creating / managing accounts	The administrator should have opportunity to create and manage accounts for the other user groups (students allowed to be enrolled in the study program)	To create and manage the accounts of all users involved in the assessment process	ADM
[2]	Manage look-up tables	The administrator should have opportunity to manage the look-up tables used in the form filling process (list of faculty staff members, …)	To manage the data with which the system should be prefilled	ADM
[3]	Manage study programmes and prerequisites	The administrator should have opportunity to manage the study programmes, prerequisites and admission quotas for every study programme	The admission quotas, accredited study programmes, dispersed study groups, prerequisites can change frequently	ADM, UAC
[4]	Manage courses	The administrator should have opportunity to manage courses, subjects and electives	Courses, subjects and electives for every study programmes should be entered into the system and according to some predefined prerequisites the students should be allowed or not allowed to participate in the course	ADM, UAC
[5]	Manage course structure	The Faculty staff should be able to manage course sections in a tree like structure	Course sections should be organized in a tree like structure.	F/SPU
[6]	Manage questions and answers	The system should support different types of questions. These questions should be organized in the course structure	Questions should be placed in leafs of the three structure. One section should contain similar questions	F/SPU
[7]	Create assessment strategies	The system should give a possibility for creation of assessment strategies	The strategies consists of specific number of questions from specific sections of the course	F/SPU
[8]	Provide reports about completed student activities	The system will enable reports about completed student activities	Reports for participation in different assessments	UA, F/SPU

ID	Functionality	Description	Objective	User
[9]	Provide reports about successfully completed assessments	The system will enable reports about successfully completed assessments per course	Different views for the students assessment status	UA, F/SP U, S
[10]	Follow the quality of completed assessment	University administration and the Faculty members should be able to follow the quality of the completed assessment with numerous statistical data	Statistical view available	UA, F/SP U
[11]	Follow the quality of the questions in the system	Faculty members responsible for specific courses should be able to follow the quality of the questions entered in the course	Statistical view available	F/SP U
[12]	Schedule assessment	Faculty members responsible for specific courses should be able to schedule assessment using previously created assessment strategy	The assessment details should be entered during this process	F/SP U
[13]	Apply for assessment	Students can apply to scheduled assessment	List of scheduled assessments should be available to the students	S
[14]	Self-assessment	The students should be able to check their knowledge before taking a scheduled assessment	Check the knowledge prior to participating in scheduled assessment	
[15]	Take assessment	On specific time and in specific environment, the students should be able to take the assessment	Assess student knowledge from specific course area	S
[16]	Provide access to assessment results	Available results from assessment activities	Different user views	UA, F/SP U, S
[17]	Provide summary reports to University Management and Ministry of Education	The system should be able to generate reports for different stakeholders	Reporting engine with customizable reports	UA

7 Reporting module

The module will address the reporting about successfully completed student activities, ECTS, quality of completed courses (GPA), and updating Europass CV.

This module will have the following main functionalities:

• Reports about completed student activities

• Reports about successfully completed ECTS

• Reports about quality of completed courses (GPA)

• Update of EuropassCV

It will further enable electronic access to university record system, issuing of diploma supplement and other certificates, updating alumni data, summary and reporting about skills and knowledge like:

• Enables access to academic results

• Enables issuing of diploma supplement

• Enables issuing of other certificates

• Updates alumni info

• Enables preparation of summary reports to University Management and Ministry of Education

7.1 Objective

The objective of this module is to design a web-based system that will support the university about the ECTS, the quality of completed courses (GPA), and the students Europass CV. The intent of the system is to:

- Exchange information about results with the module for student services
- Follow the quality of completed courses
- Provide reports about completed student activities
- Provide reports about successfully completed ECTS
- Provide reports about quality of completed courses (GPA)
- Provide automatic update and availability of EuropassCV
- Provide access to academic results
- Provide issuing of diploma supplement
- Provide issuing of other certificates
- Updates alumni info
- Provide summary reports to University Management and Ministry of Education

The main objective of this module is enable an integrated system that will automate the task carried out by different persons in the organization and performing tasks in the area of ECTS, student sevices and diploma supplement.

7.2 General Overview

The system is intended to be used by the students and university staff, the university administration, and other stakeholders.

The system is a web based integrated IS. It should be accessible from public Internet network taking known techniques for online and protection of data.

7.3 Scope

The aim of the proposed system is cover all the functions conduced in relation to the ECS, Europass CV, diploma supplement and reporting to the ministries.

The system should enable the future extension to almost fully paperless process including transferring the basic data of the candidates and their certificates in fully digital form (digitally signed) from and to other certificate providers.

7.4 Existing System(s)

No university has an integrated web-based system that can support the process of ECTS. There are isolated software apllications that are not an integrated IS.

7.5 Benefits

The aim of the proposed module is to address the limitations of the current systems. Following are the objectives of the proposed system:

- Reducing time in activities.
- Centralized data handling and integration with the module for student services.
- Paperless administration with reduced manpower.
- Cost cutting
- Transparency
- Available services to student and administration
- Operational efficiency

7.6 Goals

The main goal of the system is to automate the process carried out in the organization with improved performance and realize the vision of paperless admission. Some of the goals of the system are listed below:

- Manage large number of candidate details.
- Create student accounts and maintain students' data in an effective way
- View all the details of the students.
- Create the statistical reports.
- Enable the candidates to take proactive role in the process by entering their data in the system
- Provide the candidates with updates of theirs current status

7.7 Users

The following users and groups are to be realized:

ID	User groups	Roles
[1]	Administrator (ADM)	Manages all setup data in the process Create and manage user accounts for user groups 2-6
[2]	University Administration (UA)	Conducts the process Monitor and supervise the process carried out by Faculty / Study programme Views and analyse reports and data Analyses statuses and response times Analyses quality of service provided Views reports about FAQ Issues reports to the University management Issues reports to media / Ministry od Education
[3]	Faculty/Study programme Users (F/SP U)	Provides data in the system about exams
[4]	Supporting personnel (SP)	Enters data from the paper only applications (received by mail, special cases, translated documents, etc.) in the system
[5]	Ministry of Education (MoE)	View various statistical reports for applied / admitted candidates
[6]	State Statistical Office (SSO)	View various statistical reports for applied / admitted candidates
[7]	Student (S)	Registers to the system Inputs personal details, fills application Fills details from his/her certificates (academic scores) Submits / prints application/ reports/diploma/ certificates Views FQA View results and progress

7.8 Basic functionalities

Basic functionalities of the module are specified as follows:

ID	Functionality	Description	Objective	User
[1]	Creating / managing accounts	The administrator should have opportunity to create and manage accounts for the other user groups	To create and manage the accounts in the enrolment process	ADM
[2]	Manage look-up tables	The administrator should have opportunity to manage the look-up tables used in the process	To manage the date that can appear in the forms in an organized way	ADM
[3]	Manage study programmes, prerequisites and admission quotas	The administrator should have opportunity to manage the study programmes, prerequisites and admission quotas for every study programme	The admission quotas, accredited study programmes, dispersed study groups, prerequisites can change frequently	ADM, UA
[4]	Manage rules, prerequisites for passing a specific programme	The administrator should have opportunity to manage: the way the credits awarded to student are being calculated; the transfer rules; and precedence rules	Point calculation, assessment exams, activities should be recorded. Certain precedence rules should be applied	ADM, UA
[5]	Exchange information about results with the module for student services	System task to enable access to the data from the IS for student services	Autoamted task	System
[6]	Follow the quality of completed courses	University administration should be able to follow the quality of the complete course with numerous statistical data	Statistical view available	UA, F/SP U
[7]	Provide reports about completed student activities	The system will enable reports about completed student activities	Reports for different queries about certificates, letters, statistical analysis	UA, F/SP U
[8]	Provide reports about successfully completed ECTS	The system will enable reports about successfully completed ECTS courses	Different views for the students ECTS status	UA, F/SP U, S
[9]	Provide reports about quality of completed courses (GPA)	The system will enable reports about quality of completed courses (GPA)	Numerous reports in this area	UA, F/SP U
[10]	Provide automatic update and availability of EuropassCV	A student should be able to generate and receive in electronic form an up to date EuropassCV.	Current EuropassCV provided	UA, S
[11]	Provide access to academic results	Available results from academic activites	Different user views	UA, F/SP U, S
[12]	Provide issuing of diploma supplement	A student should be able to generate and receive in electronic form an up to date	Current diploma supplement provided	UA, S

ID	Functionality	Description	Objective	User
		diploma supplement.		
[13]	Provide issuing of other certificates	A student should be able to generate and receive in electronic form an up to date certificate about his/her progress during the studies.	Provide online way to promptly receive digitally singed certificates	UA, S
[14]	Updates alumni info	The system should enable the alumni student to update their profile with register of certificates and references.	Online system for tracking alumni students	All
[15]	Provide summary reports to University Management and Ministry of Education	The system should be able to generate reports for different stakeholders	Reporting engine with customizable reports	UA