Ministry of Education and Science of Ukraine

Kharkov State Technical University of Radioelectronics

The Set of Manuals for Management of Students' M.Sc. Thesis Work

Kharkov 2000

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The Set of Manuals for Management of Students' M.Sc. Thesis Work for students, supervisors, reviewers, examining board and university subdivisions

Approved by
Department of
Artificial Intelligence
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PREFACE

This set of manuals was aimed to introduce a new framework for the management of students' M.Sc. thesis work.

This set of manuals was developed as an outcome of the Tempus compact project UM_CP-20560-1999 of a TACIS programme. The TACIS programme is a European Union Initiative for the New Independent States and Mongolia which fosters the development of harmonious and prosperous economic, political and social links between the European Union and these partner countries.

The special Tempus programme is the trans-European co-operation scheme for higher education, adopted by the Council of Ministers of the European Union on 7 May 1990. The main goals of Tempus Tacis are:

- to promote the development of the higher education systems in the partner countries;
- to encourage interaction and balanced co-operation between higher education institutions in the partner countries and the European Union.

The full title of the UM_CP-20560-1999 project is "Development of a New Framework for the M.Sc. Thesis Work". This edition is the result of cooperation between the Kharkov State Technical University of Radioelectronics, Ukraine, the University of Jyvaskyla, Finland and the Athens University of Economics and Business, Greece.

ACKNOWLEDGEMENTS

The project team from the Kharkov State Technical University of Radioelectronics, Ukraine wants to thank the teams of the University of Jyvaskyla, Finland and the Athens University of Economics and Business, Greece for their cooperation within this project.

We would like to thank Prof. Seppo Puuronen for the information he provided about existing scheme of organizing M.Sc. thesis work at the Department of Computer Science and Information Systems, University of Jyvaskyla.

Our special thanks are to the project coordinator, Prof. Kalle Lyytinen, the dean of the Faculty of Information Technology, University of Jyvaskyla to whom the cooperation between our university and the partner universities was made possible within the project UM_CP-20560-1999 - “Development of a New Framework for the M.Sc. Thesis Work”.

The project team also wants to thank the subdivisions of home university for understanding and supporting the development of a new framework.

INTRODUCTION

The master's degree is awarded in arts, science, music, engineering, business administration, and education all over the world. Master's education is in principle a new stage for Ukraine in preparing specialists with advanced levels of proficiency.

In the Law "About Education" of Ukraine the Ukrainian educational system is described as multilevel. Such educational systems exist in many foreign countries and now it is introduced in Ukraine. Multilevel educational provides stepwise education, which gives students the opportunity to stop at a sufficient level and to continue their education later if necessary.

The primary level of higher education in Ukraine is the Bachelor's degree. The middle level is the degree of Specialist and the highest level is the Master's degree. Here the advantage of multilevel system is demonstrated. If the student wants to complete higher education at the minimal level he can then progress to the specialist's degree. In order to become a high ranking professional in his area, and to obtain extended knowledge the student can study under the Master's curriculum. Students should decide themselves on which level (Bachelor, Specialist or Master) to stop.

The requirements for some Master of Science degrees can be fulfilled in one academic year (two semesters) wholly devoted to advanced study. In other cases, one and one-half or two years of study may be required to complete requirements. A candidate must complete all the requirements for the master's degree within five years from the time of initial registration for graduate study.

There are several components in Master's studies, which distinguish it from Specialist' level. First of all Master of Science (M.Sc.) obtains a more complete and deep knowledge in special courses than the Specialist. Moreover M.Sc. students are required to study several additional courses without assistance. All M.Sc. students should realize their full knowledge potential in writing the M.Sc. thesis. Preparation of a thesis is one of the most important parts of work leading to a M.Sc. degree.

The most important distinction between Master's and Specialist' degrees is increase in the scientific level of the M.Sc. thesis. The requirement for a Specialist is to possess the ability to apply obtained knowledge in practice. A Master of Science should focus his attention on scientific research, and the development of theoretical aspects of new techniques.

If M.Sc. thesis contains profound and new ideas it can be recommended to be the basis of a Ph.D. thesis.

Until now there was no unified and strict scheme for the management of students' thesis work. Consequently, a new framework for management of students' M.Sc. work was required.

This set of manuals is aimed to collect and generalize the positive experience of Ukrainian and foreign universities in the field of management of thesis work. The renewed scheme for management is provided. New principles are introduced. The most important is the principle of academic independence. It enables students to be self-oriented in selecting a supervisor and a topic of the thesis work. Another innovation is group work in seminars. Finally the accreditation of thesis work performed in a partner university is implemented. The special scheme of information exchange between the home and partner university is described.

Publication of this set of manuals is the final step in forming the clear framework for management of M.Sc. thesis work.

GENERAL SCHEME FOR MANAGEMENT OF STUDENTS' M.SC. THESIS WORK

1. INTRODUCTION

The general scheme for management of students' M.Sc. thesis work was developed in order to provide a clear understanding of the whole structure and all chains in the management process. The general scheme contains a description of cooperation for all possible parties at every stage of thesis work. Every stage scheme shows the parties, who are involved in the cooperation on this stage and directions of their cooperation.

The whole cycle of thesis work is divided into 8 stages. Schemes of actions for all members of the management process together with detailed explanations about each item are given in the pictures 1-8, below.

2. STAGE 1: SUPERVISOR AND TOPIC SELECTION

2.1 Time

Supervisor and topic selection should be done during the first month of autumn term (1.09 – 30.09)

2.2 Brief description

On the first stage student the selects a supervisor for the thesis work and makes a preliminary choice of thesis' topic.

2.3 Changes from the previous scheme

In the previous Ukrainian scheme for students' M.Sc. thesis work the department assigned a supervisor to a student and the supervisor assigned the topic of the thesis. Thus, freedom of scientific research was poorly provided. Most European universities allow their students to select the topic for their thesis.

Presentations about the research leads of potential supervisors were not provided before. Consequently even if the student had a choice in supervisor selection

he couldn't make an informed decision. Students were acquainted only with the research leads of those supervisors who had given lectures to them. They therefore could miss interesting scientific leads from professors who actively perform research. The new scheme provides information of all basic research leads in the native department and enough freedom in selection of supervisor and thesis' topic. Also the new practice of course reading is introduced.

2.4 Stage scheme

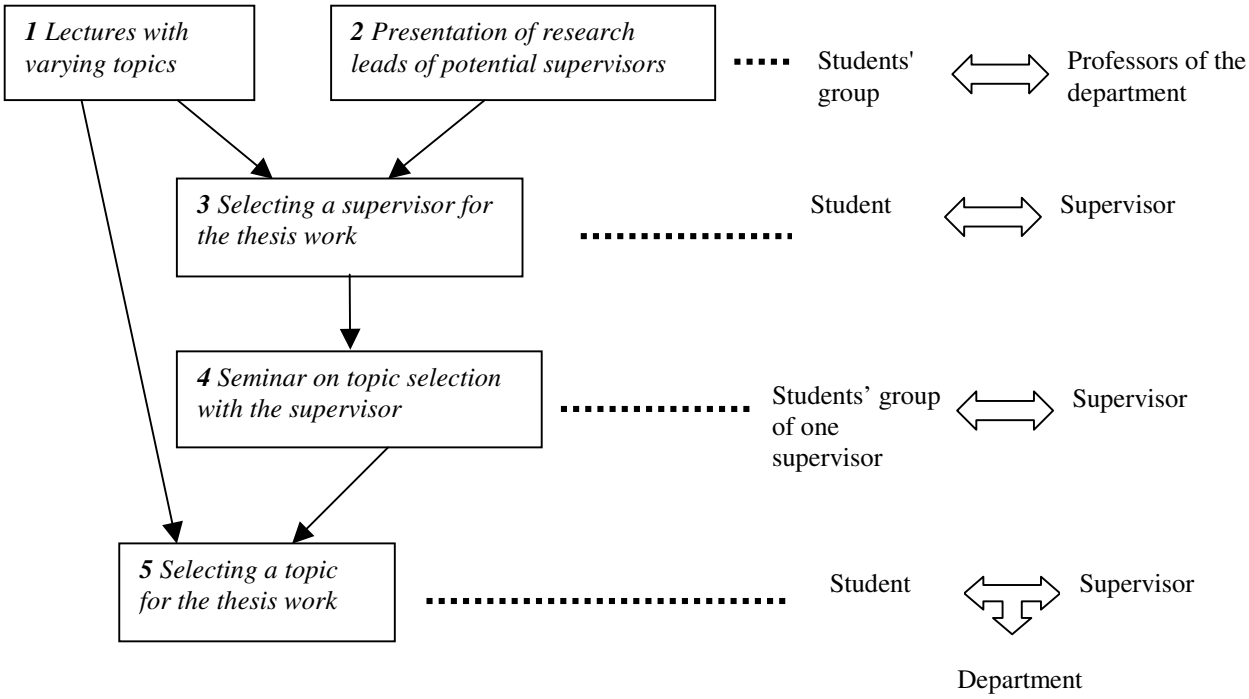


Fig.1- The scheme for supervisor and thesis topic selection

2.4.1 Students visit lectures with varying topics according to the curriculum for M.Sc. students. Students can visit block lectures (intensive course during 2-3 weeks with an immediate examination). This is a new practice for Ukraine. If some professors, lecturers and assistants of the department work abroad, they can visit Ukraine for several weeks and read the best courses from the best European universities to M.Sc. students.

2.4.2 The department provides a list of possible supervisors and the number of potential M.Sc. students for each supervisor. Potential supervisors - professors of a

department – present their research leads. Departments should organise this seminar to run until September 15.

2.4.3 The student selects a supervisor for his M.Sc. thesis work. Only a professor can be a supervisor of a M.Sc. thesis work. When the student chooses his supervisor he puts his name on the list of this supervisor's students. If there are no free places on the list, the student can still select the desired supervisor by mutual agreement

2.4.4 Students that have selected the same supervisor gather into one group. They will work in this group on seminars with their supervisor. The first seminar is to select a topic for a thesis.

The supervisor should have 4 hours in his working schedule for this seminar.

2.4.5 Students select a topic for their thesis work according to the principle of ***academic independence***, which means that the framework of this project provides the student with the means to be self-oriented in selecting a topic and research methods for his M.Sc. thesis.

If a student is exchanged to a partner university he should send a letter with his selected topic by mail or e-mail. The letter should contain the topic name in Russian and Ukrainian.

Topics should be fixed in the department by October 1.

3. STAGE 2: PRELIMINARY WORK AND TOPIC APPROVAL

3.1 Time

This stage lasts for 6 weeks during the autumn term (1.10 – 15.11)

3.2 Brief description

The second stage includes preliminary work on the selected topic, discussions in students' groups with the supervisor, possible changes of the topic and final topic approving.

3.3 Changes from the previous scheme

The previous scheme for students' thesis work entailed students mainly working individually on their thesis. The new scheme provides for group work for those students who have selected the same supervisor and work on the same research lead. Group work fundamentally improves the quality of education of students working on their theses. It provides the following opportunities:

- discussing the progress and results of their work with other students at different stages of thesis work;
- presentation of one's thesis;
- evaluating as an expert, other students' work.

The stage is completed by a seminar in which students present the selected focus of their research.

Besides the new practice of block reading the M.Sc. courses continues as follows.

3.4 Stage scheme

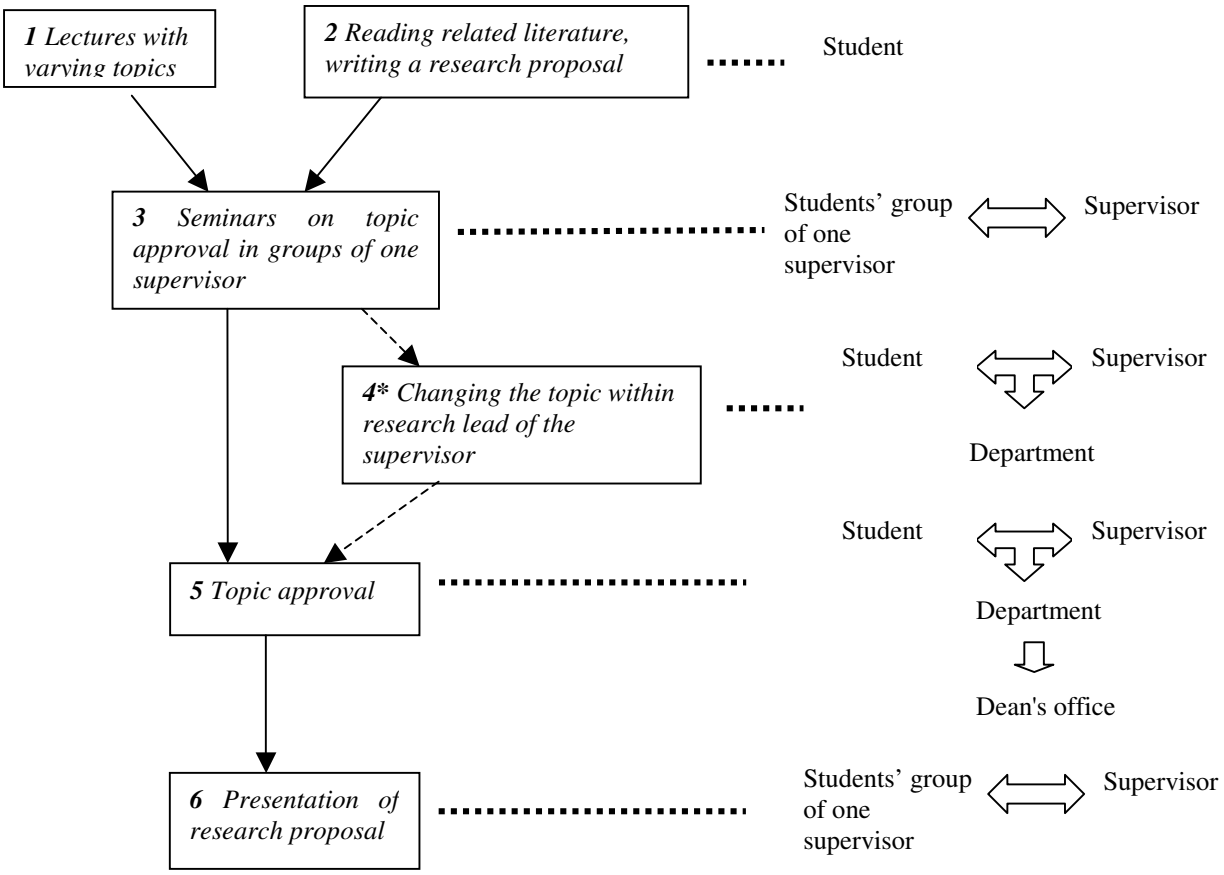


Fig. 2- The scheme for topic approval

3.4.1 Students continue to visit lectures according to curriculum for M. Sc. students. Block lectures can be read (see **2.4.1**).

3.4.2 Students search and read literature in the field of their topic and write a research proposal (objectives and proposed research methods for the future thesis work). The research proposal must contain the main problems in the research area and objectives of the thesis work.

3.4.3 Students' group work to discuss proposed topics. Each member of the group presents a research proposal. Others act as opponents.

3.4.4 If student wants to change the topic he can change it to another one within the research lead of the selected supervisor. Please note that on Stage 2 the student can change the topic of a thesis work but can't change the supervisor. The deadline for changing topic is October 31. The changed topic is fixed in the department.

3.4.5 The topic for the M.Sc. thesis should reflect the modern state of science and it should allow the student to demonstrate his academic thinking.

If the student has selected an external topic (sponsored by an external organisation) he should obtain a letter of support from this organisation. He should also obtain the approval of his supervisor for the selected topic.

If a student is exchanged to a partner university he should send a letter containing the selected topic, the grounds for his choice and a statement of approval, signed by the corresponding department of the partner university. The letter should contain topic name in Russian and Ukrainian.

The department should give approved topics to the dean's office by November 10.

4. STAGE 3: BEGINNING THE THESIS WORK

4.1 Time

During the second half of the autumn term (15.11 – 31.12)

4.2 Brief description

This stage includes preparing the thesis implementation, passing courses, literature analysis and background work, accurate task formulation, attending seminars. This stage results in obtaining permission to move forward with the thesis.

4.3 Changes from the previous scheme

The new scheme for preparing the thesis includes students who have the same supervisor participating in group work (see Stage 2).

On this stage the new practice of reading block courses continues.

An important difference is the accounting of credits and courses from a partner university.

4.4 Stage scheme:

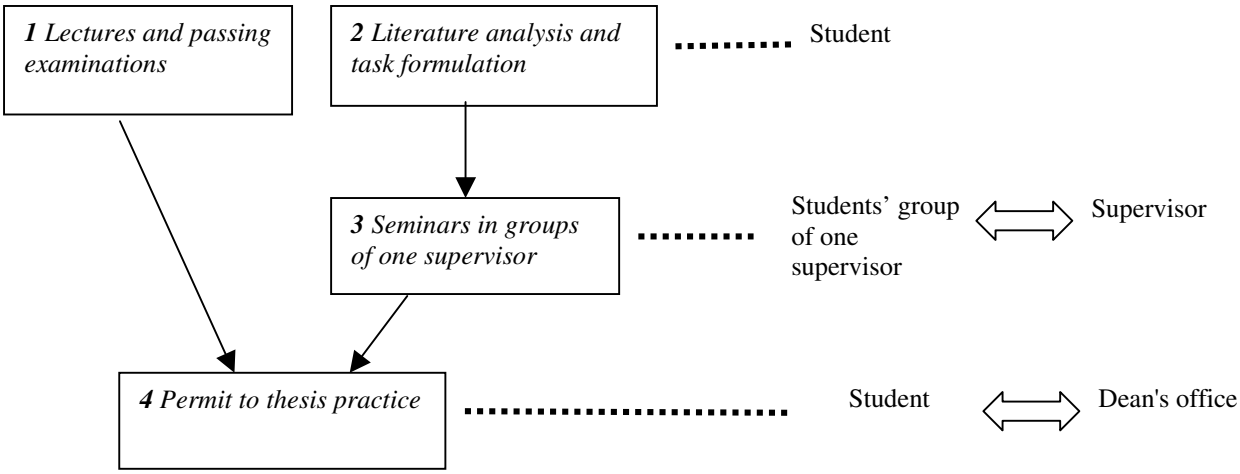


Fig. 3- Beginning the thesis work

4.4.1 Students visit lectures according to the curriculum for M. Sc. Students and pass examinations. Block lectures can be read (see **2.4.1**).

4.4.2 Students analyse literature in the field of their topic. They extend their research proposals with current problems and solutions. Students write a task formulation for the M.Sc. thesis work.

4.4.3 Students work in small groups with their supervisors. Each student prepares a report on the topic of their thesis, and acts as an opponent to another student. On Stage 3 seminars are devoted to approval of task formulation and literature analysis.

4.4.4 If the student obtains the required credits and passes examinations and obtained his supervisors approval of his task formulation, then he is permitted to begin researching his thesis.

The Dean's office should permit students to thesis practice by December 31.

5. STAGE 4: M. SC. THESIS PRACTICE

5.1 Time

M.Sc. practice work lasts for 2 months during the spring term (10.01 – 15.03)

5.2 Brief description

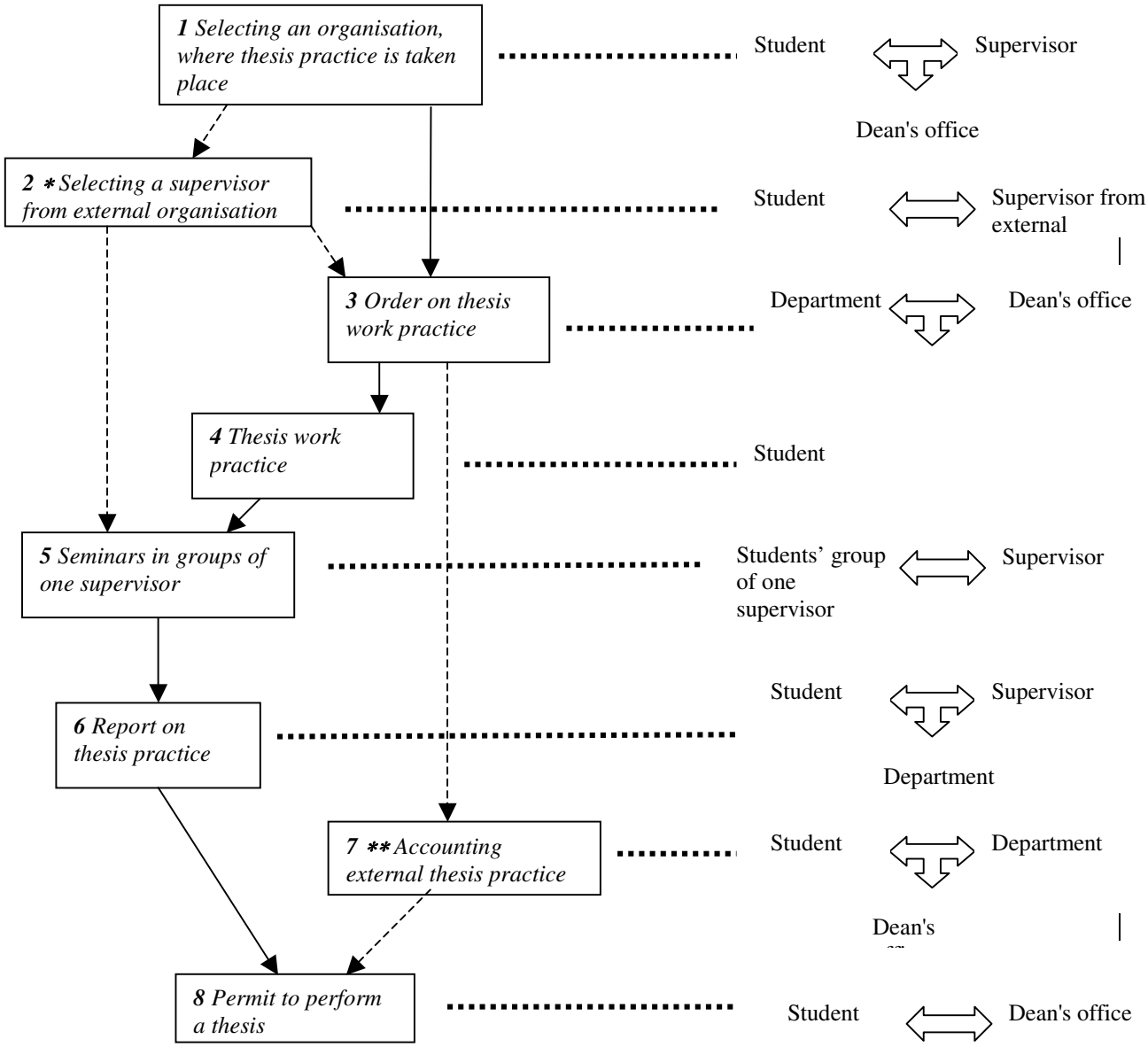
The fourth stage includes thesis work practice in the university or other chosen organisation. Main research and implementation skills of student should be demonstrated.

5.3 Changes from the previous scheme

The basic difference from the earlier scheme of passing M.Sc. practice is the opportunity to account practice from the partner university. In this case all the necessary supporting documents (report on practice, etc.) should be given. Thus the opportunity to examine a wider range of the practical problems connected to a chosen direction of work and also expansion of a circle of people participating in discussions and work are provided.

5.4 Stage scheme:

5.4.1 If a student is taking his thesis work practice in an external organisation he should provide a letter of support from this organisation. The letter of support should be delivered to the Dean's office by January 10.



∗ if the student takes his thesis work practice in external organisation.

∗∗ if the exchanged student takes his thesis work practice in the partner university.

Fig. 4 - The scheme for thesis work practice

5.4.1 If student takes his thesis work practice in an external organisation then he should provide a letter of support from this organisation. The letter of support should be delivered to Dean's office by January 10.

5.4.2 If student takes his thesis work practice in an external organisation then he should select a supervisor from the external organisation. Only a leading researcher can be a supervisor of a M.Sc. thesis work practice.

5.4.3 The Dean's office should prepare and the rector of the university should sign the order on thesis work practice by January 10-12.

5.4.4 Student prepares a schedule for his thesis work and implements it.

5.4.5 On Stage 4 the group work seminars are devoted to thesis work implementation. If a student takes his thesis work practice in an external organisation then seminars are held there.

5.4.6 Students should present a report on their thesis practice to a supervisor by March 10.

5.4.7 If a student is exchanged to a partner university he should send a report on his thesis work, signed by the corresponding department of the partner university by March 10.

5.4.8 The Dean's office should account for the thesis practice, if all requirements are met, by March 15.

6. STAGE 5: THESIS WRITING

6.1 Time

Students should devote about two months of the spring term to writing the final thesis (15.03 – 15.05).

6.2 Brief description

The thesis write-up is considered a major part of the M.Sc. thesis work. The student should include in the thesis a clear statement of the problem, a description of the history and background literature on the subject, a statement of the author's work and observations, a discussion of the results, the author's conclusions and suggestions for further work.

6.3 Changes from the previous scheme

Innovation consists of so-called "multi-trial" defence holding. The student presents the final results of his thesis work to a consultant and supervisor as a first trial defence. The provision of several preliminary presentations of the thesis allows the student to study his weak spots and rectify possible mistakes.

6.4 Stage scheme:

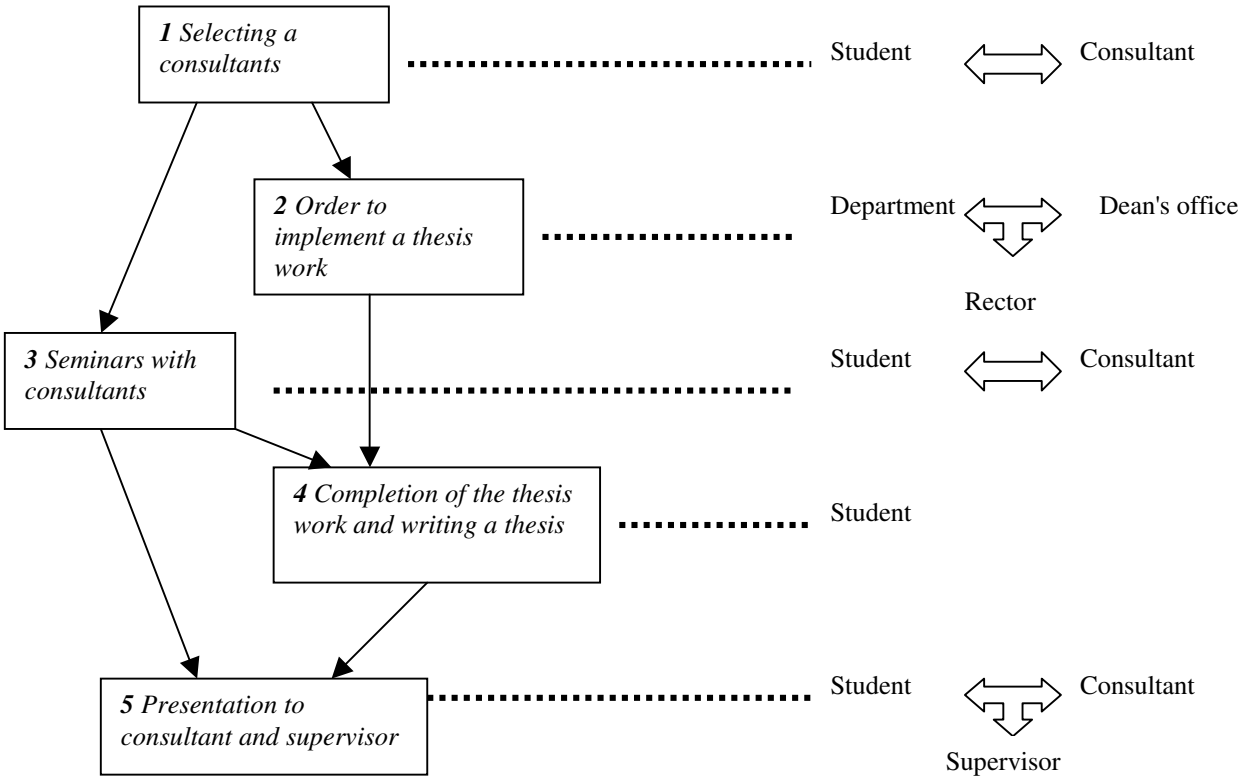


Fig. 5 – Thesis writing stage

6.4.1 The student selects a consultant in the speciality chosen and a consultant in economics for the thesis work. Consultants should be specialists in the selected field of research.

6.4.2 The Dean's office should prepare and the rector of the university should sign the order on the thesis work implementation by March 20.

6.4.3 The student reports his thesis work to a consultant. The consultant should be acquainted with the draft thesis and give recommendations.

6.4.4 The student completes his M.Sc. thesis work and completes writing a thesis. He produces an economical evaluation of the M.Sc. thesis.

6.4.5 The completed thesis is presented to the consultant in speciality and supervisor. Materials should be presented in a slide form. This is the first defence of the completed thesis.

7. STAGE 6: THESIS WORK EVALUATION

7.1 Time

Evaluation of a thesis work should be done during 15.05 – 31.05

7.2 Brief description

Stage of evaluation includes thesis review and preliminary defence in the department.

7.3 Changes from the previous scheme

The difference from the previous scheme is the use of a clear set of thesis work evaluation criteria. In the previous scheme supervisors were not able to use accurate directions, and thus evaluation was often opinion based. The new scheme defines strict criteria to be used and awards eight different marks.

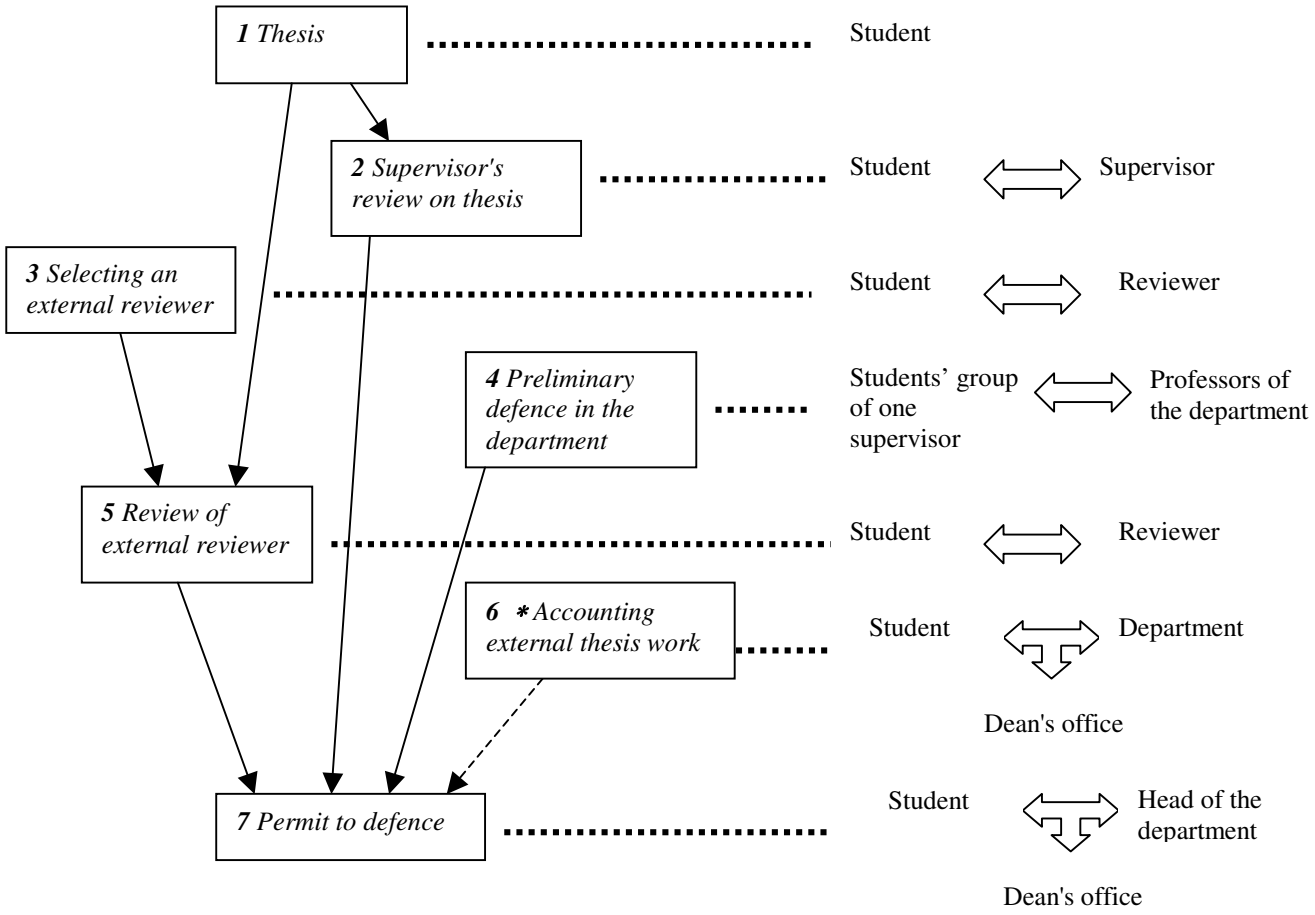
The new scheme also provides the opportunity to account the evaluation from the partner university.

7.4 Stage scheme

7.4.1 The completed thesis should be given to the supervisor for reviewing by May 15.

7.4.2 The supervisor evaluates the students' thesis work according to the appropriate criteria by May 20.

7.4.3 An external reviewer should be selected to produce an independent review of a M.Sc. thesis work.



* if exchanged student implements his thesis work in partner university.

Fig. 6 – The scheme of thesis evaluation

7.4.4 Preliminary defences should be held in the native department by May 25. During the preliminary defence students of one supervisor present their thesis works and answer questions.

7.4.5 Following the supervisors review the thesis should be given to an external reviewer. He evaluates the students' thesis work according to appropriate criteria and gives his review by May 25.

7.4.6 If student was exchanged to a partner university and wrote his thesis there he should present the thesis and reviews in the department of the partner university by March 20.

7.4.7 The head of the department should permit a student to defend his thesis if all requirements are met and inform the Dean's office by May 31.

8. STAGE 7: THESIS WORK DEFENCE

8.1 Time

Defence of the thesis work should be done during 1.06 – 15.06

8.2 Brief description

The defence of a student's thesis is a crucial phase in the M.Sc. course. The student makes an oral presentation of his thesis work to the examining board.

8.3 Distinct from the previous scheme

The difference from the previous scheme is the use of a clear set of thesis work's evaluation criteria for the examining board. The new scheme defines strict criteria to be used and awards eight different marks. The criteria used are the same criteria as for the supervisor and reviewer. Thus the objectivity of the evaluation is guaranteed.

8.4 Stage scheme:

8.4.1 The reviews of the supervisor and external reviewer are announced to the examining board during the defence.

8.4.2 The student presents his thesis to the examining board. The presentation should contain an introduction, an analysis of the present state in this field, task formulation, the research method used, the main results and recommendations.

8.4.3 The examining board evaluates the student's work according to the appropriate criteria and makes a decision.

8.4.4 If the student doesn't agree with examining board's decision he can appeal to the rector.

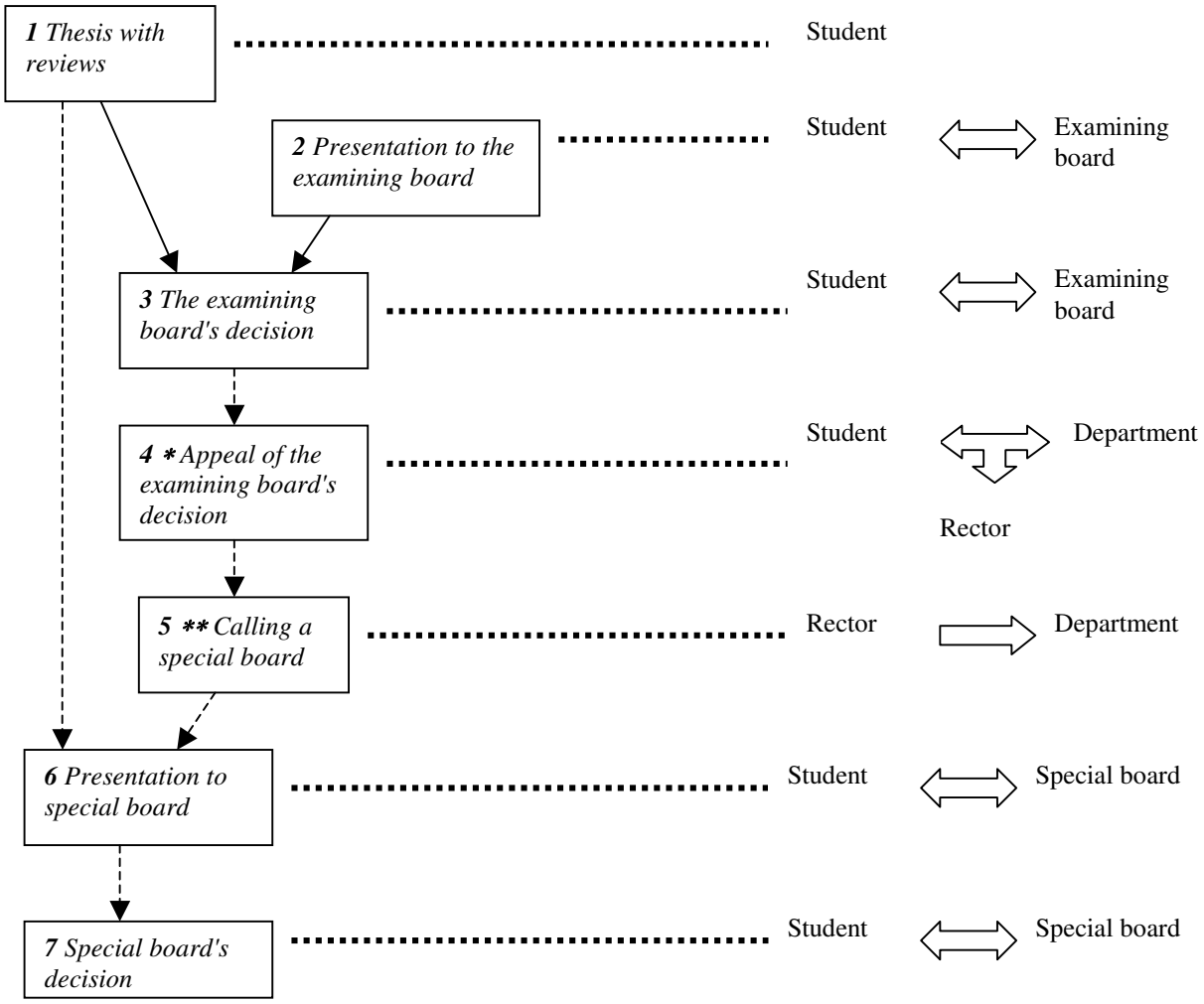


Fig. 7 – The scheme of thesis defence

8.4.5 If the rector upholds an appeal he calls a special board. The special board consists of leading scientists at the university.

8.4.6 The student repeats the presentation of his thesis to the special board.

8.4.7 The special board makes a final decision.

9. STAGE 8: REGISTRATION AND ARCHIVVING M. SC. THESES

9.1 Brief description

Completed M.Sc. theses are deposited and archived.

9.2 Changes from the previous scheme

Electronic versions of theses will be kept on the Web-server at the department. This allows easy access to M.Sc. theses of preceding years.

9.3 Stage scheme:

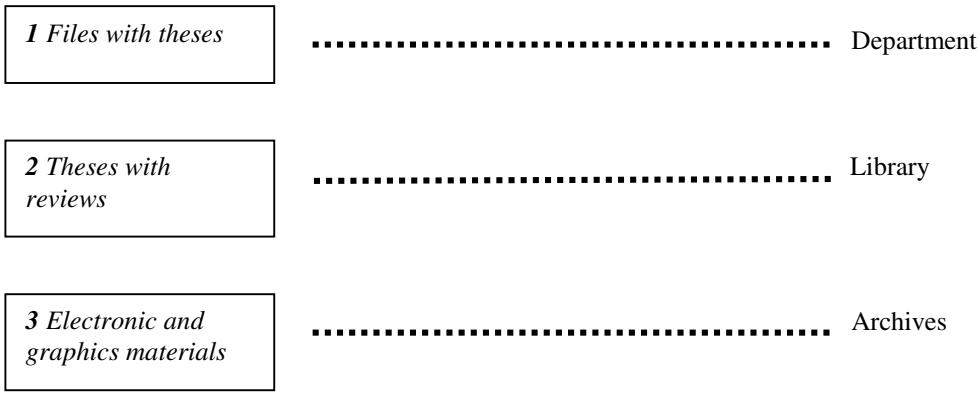


Fig. 8 – The registration and archiving stage

9.3.1 Files with theses should be registered and uploaded on the Web-server at the department.

9.3.2 Theses with reviews should be registered and kept in the university library for 10 years.

9.3.3 Electronic (programs, databases) and graphics materials (posters) should be registered and kept in the archives for 10 years.

EVALUATION CRITERIA FOR M.SC. THESIS

1. EVALUATION CRITERIA FOR THE THEORETICAL M.SC. THESIS

Laudatur (the highest possible)

- theoretically strong, original
- literature covers all relevant literature, references are used carefully
- problem is defined very carefully, problem definition is theory based, solution of the problem is clear and it includes essential contribution
- selection of methods is well defined, use of methods is careful and systematic
- text is fluent, splendid, structure is clear and consistent, structure of makro level is under control
- appearance is irreproachable and accurate
- work can be published or it has been published in ref. conference or magazine
- needs only minor revision to become a Ph.D. thesis

Eximia

- theoretically strong, original
- literature covers all relevant literature, references are used carefully,
- problem is defined clearly with arguments, problem definition is theory based (or difficult and up-to-date)
- includes clear contribution
- selection of methods is argumented, use of methods is careful
- text is fluent, structure is clear and consistent
- appearance is irreproachable and accurate
- after revisions work can be published in ref. conference or magazine
- needs essential revisions to become a Ph.D. thesis

Magna cum laude

- theoretically mature, shows that the writer is well acquainted with the
- subject and understands it well

- literature covers relevant literature, references shows that literature is under the writer's control
- problem is defined with arguments and clearly
- methods are used correctly
- text is fluent, there are no remarkable mistakes in the structure
- appearance is irreproachable and includes only very few mistakes

Cum laude approbatur

- shows that the writer is familiar with theories and understands the most essential parts of them
- there are not remarkable deficiencies in the coverage of literature, use of references shows that literature is satisfactory under the writer's control
- problem is defined clearly
- there are not remarkable mistakes in the use of methods
- text is good, there are no remarkable deficiencies in the structure
- appearance is irreproachable and includes only few mistakes

Non sine cum laude approbatur

- the writer is satisfactory familiar with theories
- the coverage of literature is satisfactory, there are some deficiencies in the use of references
- there are minor deficiencies or inconsistencies in the problem definition
- there are minor deficiencies in the use of methods
- text is tolerable, there are minor deficiencies in the structure
- appearance includes no big problems and mistakes

Lubenter

- the writer is tolerable familiar with theories
- the coverage of literature is limited, often only otherwise familiar ones and written in mother language, literature has been used mechanically
- problem definition insufficient or inconsistent
- there are remarkable deficiencies in the use of methods
- text is rigid, includes syntax errors, there are essential deficiencies in the structure

- appearance is incoherent and includes mistakes

Approbatur

- the writer is poorly familiar with theories or thesis includes almost no theories at all
- the coverage of literature is very limited, literature has been used mechanically
- problem definition is poor
- the use of methods is weak
- text is rigid, includes syntax errors, there are big deficiencies in the structure
- appearance is bedraggled

2. EVALUATION CRITERIA FOR CONSTRUCTIVE M.SC. THESIS

Laudatur (the highest possible)

- theoretically strong, original
- literature covers all relevant literature, references are used carefully are critically
- construction is defined very carefully, construction is theory based, subject is difficult and up-to-date, construction is clear and it is evident and indisputable that it can be applied
- contribution expands existing applications
- construction is well defined, analysis and design is careful and systematic
- text is fluent, splendid, structure is clear and consistent
- appearance is irreproachable and accurate
- work can be published or it has been published in ref. conference or magazine needs only minor revision to become a Ph.D. thesis

Eximia

- theoretically grounded, original
- literature covers all relevant literature, references are used carefully
- construction is defined clearly with arguments, topic is and up-to-date
- includes clear contribution
- analysis and design of the construction is careful

- text is fluent, structure is clear and consistent
- appearance is irreproachable and accurate
- after revisions work can be published in ref. conference or magazine
- needs essential revisions to become a Ph.D. thesis

Magna cum laude

- theoretically mature, shows that the writer is well acquainted with the subject and is able to design construction
- literature covers relevant literature, references shows that literature is under the writer's control
- construction is defined with arguments and is clear
- text is fluent, there are no remarkable mistakes in the structure
- appearance is irreproachable and includes only very few mistakes

Cum laude approbatur

- shows that the writer is familiar with subject area and knows other solutions
- there are not remarkable deficiencies in the coverage of literature, use of references shows that literature is satisfactory under the writer's control
- construction is clear
- there are not remarkable mistakes in the design of the construction
- text is good, there are no remarkable deficiencies in the structure
- appearance is irreproachable and includes only few mistakes

Non sine cum laude approbatur

- the writer is satisfactory familiar with the subject area and solutions
- the coverage of literature is satisfactory, there are some deficiencies in the use of references
- the construction is modest, there is nothing new with respect to the existing solution, there are minor deficiencies in the design of construction, implementation inadequate
- text is tolerable, there are minor deficiencies in the structure
- appearance includes no big problems and mistakes

Lubenter

- the writer is tolerable familiar with other solutions
- the coverage of literature is limited, often only otherwise familiar ones and written in mother language, literature has been used mechanically
- construction is insufficient or it does not work
- there are remarkable deficiencies in the design of the construction
- text is rigid, includes syntax errors, there are essential deficiencies in the structure
- appearance is incoherent and includes mistakes

Approbatur

- the writer is poorly familiar with subject area and other solutions
- the coverage of literature is very limited, literature has been used mechanically
- construction is poorly planned and designed
- text is rigid, includes syntax errors, there are big deficiencies in the structure
- appearance is bedraggled

3. SCHEME FOR CONVERSION UKRAINIAN GRADE MARKS TO NEW GRADE MARKS

Theoretical Thesis Evaluation	Mark given by examining board	Recommended for the postgraduate studies	Mentioned research abilities or there are published articles
Laudatur	5	YES	YES
Eximia	5	NOT	YES
Magna cum laude	5	NOT	NOT
Cum laude approbatur	4	NOT	YES
Non sine cum laude approbatur	4	NOT	NOT
Lubenter	3	NOT	NOT
Approbatur	2	NOT	NOT

Constructive Thesis Evaluation	Mark given by commission	Recommended for the postgraduate studies	Recommended for implementation
Laudatur	5	YES	YES
Eximia	5	NOT	YES
Magna cum laude	5	NOT	NOT
Cum laude approbatur	4	NOT	YES
Non sine cum laude approbatur	4	NOT	NOT
Lubenter	3	NOT	NOT
Approbatur	2	NOT	NOT

THE MANUAL FOR IMPLEMENTATION OF STUDENTS' M.SC. THESIS WORK

1. INTRODUCTION

This manual determines overall requirements to implementation of the students' M.Sc. thesis work. The manual should help students to obtain the information, which will be necessary for them to successfully complete and defend their M.Sc. thesis work. Also in this manual are descriptions of issues pertinent to the criteria for choosing a thesis topic, the content and volume of the thesis work, of the construction and implementation of the thesis works and it's defence.

This manual describes a fundamentally new scheme of the students' M.Sc. thesis work, which meets the requirements of current programs and is designed to eliminate discrepancies between the Ukrainian and European educational standards. It enables students to use work produced at the University as a basis to continue course at a partner university. The new scheme has introduced the practice of accrediting study units which enables students studying in partner University's or participating in exchange programs to have completed work accredited. The scheme adds to the educational process a new principle of academic independence, which is a new concept for Ukraine. This principle should give to students the wider rights in choosing the topic of thesis work, choosing a research lead and should encourage all kinds of scientific initiatives. This scheme will support students' independent learning capabilities and information gathering abilities. The scheme builds on the positive experiences of the previous scheme of obtaining Specialist' degree in Ukraine extending it particularly in the field of academic research training required to meet the M.Sc. degree specifications.

The scheme divides the process of conducting the M. Sc. thesis work into clear stages with set objectives and specific tasks to complete. The scheme also includes a set of criteria to evaluate M.Sc. theses which ensures the impartiality of the evaluation. The scheme is easy to follow and fulfils the descriptions of specialities' qualification and it also fulfils the requirements for the publishing of technical papers.

The manual was produced to ensure that all parties participating in the M.Sc. program understand and work to the same set of criteria. This enables students to continue their theses in partner universities via an exchange program. The manual clearly defines the expectation and requirements of the students at all stages of the thesis and should ensure that students successfully complete all tasks within the required timeframe.

The manual is generic to all specialities but should be supplemented with specific manuals from the department in which the student studies his M.Sc. program.

2. OBJECTIVES AND TASKS OF M. SC. THESIS WORK

Completing the research task, writing up findings and defending the thesis is the final and fundamentally important stage of the M.Sc. program. The main task of the program is to prepare the student to perform independent research and engineering activities. It is therefore important that the student thinks carefully about topic selection, thesis structure and research methods to ensure that the completed thesis demonstrates the full scope of his ability to lead a research project and add something new to the existing body of knowledge.

3. RIGHTS AND DUTIES OF STUDENTS

Rights:

- to select a supervisor and thesis work topic;
- to select consultants;
- to select an external organization for external practice;
- to attend the group seminars of the chosen supervisor;
- to appeal the examining board's decision to the rector;
- to account external courses, practice and thesis work (i. e. at partner-university).

Duties:

- to attend lectures and pass examinations, which are contained in the curriculum;
- to approve the external topic with a supervisor from the university;

- to obtain all necessary documents, signed by the appropriate department of the partner university, for accreditation of external work;
- to present a practice report to a supervisor;
- to submit his completed thesis work to his supervisor for signing;
- to pass the preliminary defence of the thesis;
- to defend the completed thesis work before the examining board according to the time-table;
- to submit files with thesis, reviews, electronic and graphical materials to the corresponding subdivisions of the university.

4. SUPERVISOR AND TOPIC SELECTION FOR THE THESIS

The framework provides a student with opportunity to select a supervisor and a topic for the thesis work. This stage takes place from 1 – 30 September.

The previous Ukrainian schemes for management of student's M.Sc. thesis work didn't provide self-selection of a supervisor and a topic for the thesis. The given scheme establishes a fundamentally new approach that consists of using the academic independence principle. That principle means that a student is allowed to independently choose both the supervisor and the topic for the thesis work, at the same time taking into account his scientific interests. The new scheme provides a freedom of scientific searching, thus giving the freedom of choice that corresponds with the schemes used in most European universities. By providing freedom of choice of supervisor selection for all students, a full range of research leads are available to him. The scheme ensures that all supervisors make presentations to inform students of the research leads in their speciality. Students should attend these presentations to ensure they choose a supervisor whose research lead most corresponds with the student's scientific interests.

A new practice in Ukraine is including block lectures (intensive courses of 2-3 weeks duration with immediate examination) within the new scheme. If some professors, lectures and assistants of the department work abroad, they can visit Ukraine for several weeks and read the best courses from the best European universities to M.Sc. students.

A student can obtain the information related to block courses from the relevant department. Each department should have special information tables. The information should be presented in a form which, suits both the department clerks and the students. The information should contain the following: the consultations and seminar time-tables, recommended standards, the thesis work design specimens and information relating to thesis implementation, etc.

The native department should provide students with all the required materials related to the thesis work before the thesis program commences.

Students attend lectures on various topics according to the M.Sc. curriculum.

The Student should visit the seminar arranged by the department by September 15, where he will learn about all the research leads of the potential thesis work supervisors.

Students should choose a thesis work supervisor and puts his name on the supervisor's student list. The number of students per supervisor is limited. If the list doesn't contain free places, the student may become the student of the supervisor. But the supervisor has to agree with another supervisor upon transfer of the free places from the latter to the former according to the established order.

Students are completely independent when choosing the thesis work topic, in line with the academic independence principle. If a student is exchanged to a partner university, he should send a letter with the selected thesis topic by mail or e-mail. The letter should contain the topic name in Ukrainian. This information should be fixed at the department by October 1.

A student, while choosing his thesis work topic should be directed by the following criteria and regulations as well as his scientific interests. The thesis work topic should:

- correspond to the requirements of the speciality qualification description;
- be current;
- correspond to the present state of science and techniques;
- allow the student to show his academic way of thinking;
- to reflect the development prospects of the corresponding technical fields, accounting for the latest scientific achievements;
- be directed to solving tasks existing in modern science and producing practical solutions;

- also it is important to keep in mind that during the M.Sc. degree preparation the emphasis is on theoretical research, new technology elaboration and innovative use of existing methods;
- the thesis work topic should provide a choice of optimal solution of the given problem using effective mathematical methods and modern computer means.

A thesis work topic is assigned to a student according to the student's written application before beginning M.Sc. thesis practice.

The thesis work should contain the following stages of solving the scientific and technical tasks:

- abstracting scientific and patent literature, finding contradictions in the known theoretical and experimental results;
- formulating the research task, aiming to eliminate the contradictions;
- producing a proposition (working hypothesis) detailing the method of achieving the thesis work objective and elaborating the science work program;
- performing the theoretical and experimental researches ;
- analysing the research results to find out the relation between new and already known results, checking the correctness or incorrectness of the working hypothesis, making new assumptions or correcting performed researches, devising methods of further research development within the given task and outside it, generalisation of results to produce a conclusive task list.

5. RESEARCH SEMINARS

Students of one supervisor form a student group and work during the seminars together with their supervisor. During the first lesson each student should choose the thesis work topic.

During implementation phase of thesis work student groups participate in subject seminars with their chosen supervisor. Supervisors must participate actively in the seminars evaluating objectively the issues under discussion and explaining to students their mistakes and shortcomings.

Seminars should be in the form of discussion groups, which is new concept for the Ukrainian education system. In the seminar each student presents his thesis topic

and the other students discuss the merits and shortcomings of the topic. If after the discussion some issues remain unclear or unresolved the supervisor facilitates a resolution and at the conclusion of the seminar the supervisor informs students of his evaluation and effectiveness of the seminar.

Initial seminar will be held by October 1 and the main purpose of the seminar is student selection of thesis topics. Supervisors are there to assist students with topic selection, answering questions and providing research insight but the decision of topic choice rests with the student in line with the academic independence principal.

6. PRELIMINARY WORK AND TOPIC APPROVAL

This section describes the second stage of implementation of the M. Sc. thesis work. This stage allows for preliminary topic work, group discussions, topic changes if required and final approval of topic selection. This stage lasts from 1.10 until 15.11.

As described, students participate in group discussions with their supervisors whereas in the previous scheme students were studied independently as individuals. The introduction of group discussions improves the quality and effectiveness of the program. Group work enables students:

- to opportunity to discuss the progress of their thesis at different stages with others students;
- to present their thesis work in seminars;
- to evaluate the thesis work of others students acting as expert.

During this stage students continue to follow the curriculum as in the previous stage.

Once the thesis topic is selected students should carefully consider the direction of their thesis having studied relevant and current literature. Students should then design a research schedule which should include details of their research, possible problems that might arise, solutions to these problems, the research methods to be used and a timeframe to achieve the various stages of the research. This should ensure that students successfully complete their thesis. The Supervisor is required to give his approval of the schedule and schedule diagram, which should then be submitted to the head of the department for approval. A student can change his thesis work topic if he finds his topic insufficient in accordance with his scientific interests. However, a

student cannot change his supervisor and must therefore choose a new topic from within the research leads available from his supervisor. The topic change should be displayed within the department. The deadline for changing topic is 31 October.

A student can select an external topic (i. e. a topic for sponsored by an external organizations needs). If this is the case a student must submit a letter of support from the external organization . Even if a student selects an external topic he is still required to select a university supervisor and is subject to the same regulations as those students who have selected a departmental topic. If a student is exchanged to a partner university via an exchange program then he should inform his university about selected topic of his thesis work. Students must submit a letter signed by the appropriate department of the partner university in which he must indicate the topic of his thesis in Ukrainian.

This stage is completed by a seminar at which each student makes a presentation of his selected research lead.

If a student is exchanged to a partner university, he implements his M. Sc. thesis work in accordance with established procedure of the partner university.

7. BEGINNING OF THE THESIS WORK

This section describes one more stage of the new structure of M. Sc. thesis work. This stage lasts from 15.11 until 31.12.

During this stage the student is preparing to implement his thesis work but must still attend lectures in accordance with the curriculum. Preparation of thesis work implementation is a direct continuation from the previous stage.

During this stage the student should analyse the literature obtained in the previous stage and focus on the design of the thesis work, the methods to be used, any problems together with solutions to enable the student to design a concise and realistic research schedule. This will enable the student to successfully obtain permission to implement his work at the conclusion of this stage. The introduction of group work seminars gives students the chance to fully explore their research topics. By presenting their research topics and schedules to other students they can benefit from the constructive criticism and wide knowledge base of the other students to ensure they have explored the full potential of their research. If a student obtains all the required

credits and passes all examinations and has his research schedule approved by his supervisor, then he is permitted to thesis practice. Students should complete all tasks and obtain the requisite approvals of this stage by 31 December.

If student was exchanged to a partner university via an exchange program he should complete and implement his M.Sc. thesis work in accordance with the requirements of the partner university.

8. M. SC. THESIS PRACTICE

This stage is the most important stage of the M.Sc. thesis program. In the previous scheme the design and implementation of the thesis research was not so integrated. In the new scheme the supervisor remains the same for both the theoretical and practice elements of the M.Sc. program The duration of this stage is from 15.11 until 31.12.

During thesis practice the student should study problems concerned with state-of-the-art scientific research, technology, economy and organization of production in the field of the thesis work topic. He should study sources of information, analogies and choose pertinent materials, documentation and other data output. He should become proficient in the substantiation of topic technique.

Students can freely choose the place to perform his thesis practice. This is a new innovation in the scheme. This means that a student exchanged to a partner university can choose an organisation close to the university in which he studies. Exchanged student should submit the necessary papers (thesis practice report and others) to his university by fax or electronic mail.

If a student has decided to take his thesis practice in an external organization then he has to submit a letter of support from that external organization. The letter must be submitted to the Dean's Office of his faculty by 10 January. If a student decides to take his thesis practice in an external organization he must choose a supervisor from that organization. The supervisor must be a leading researcher or scientist. For the purposes of this document supervisor refers to the person chosen to supervise the thesis work regardless of whether he is a university professor or a member of an external organization. The Dean's office should prepare and the rector of university should sign the order on thesis work practice by 10-12 January.

Students should ensure that the thesis topic and the thesis practice tasks synthesise. The student should take full advantage of the support offered by the group seminars and his supervisor to ensure this is so. All problems and tasks listed in the thesis research schedule should be completed and resolved in thesis practice. The implementation of tasks and research should be noted in a report which must be submitted to the thesis practice supervisor by March 10.

Seminars will continue during thesis practice. If a student is taking his thesis practice in an external organization then seminars should be held within the organization in accordance with the procedure already mentioned.

If the student fulfils all the necessary requirements the Dean's office must accredit the work practice by 15 March. If the student is exchanged to a partner university the practice report must be submitted via facsimile or electronic mail and the report should be signed by the students' supervisor at the partner university. The report should be submitted by March 10.

9. WRITING A THESIS

This section describes the proper implementation of the main part of M. Sc. thesis work. This stage is lasts from 15.03 until 15.05During this stage the student is required to document all the findings of his research thesis practice and write the thesis using all the knowledge acquired during the previous stages of the program. The complete written thesis is submitted to the examining board for defence which, is the final stage of the program. However an exciting innovation has been introduced in this stage to ensure the student has the best chance of successfully defending his thesis before the examining board. The student presents his thesis to his supervisor and a specialist consultant. The supervisor and consultant provide the student with constructive feedback and the student then has the opportunity to revise his thesis in light of the recommendations. The thesis is also checked by consultant in the field of economics. After checking the appropriate part of the thesis the consultant should sign the thesis.

To help the student at the department, engineering standard inspectors can be appointed to check that thesis meets the standards of normal technical documents.

The rector must sign the order on thesis work implementation by 20th of March if the student has fulfilled all requirements.

Thesis work should be drawn up in accordance with the established procedure listed in the directive documents of Ministry of Education and Science of Ukraine relating to thesis work implementation according to the requirements of the Ukrainian state standards and integrated systems of standards.

The list of standards, which are used in drawing up the thesis work for different specialities, and universities, should be in the manuals of each speciality.

Theoretical research is carried out during the implementation of thesis work, for example, when properties of design objects and their mathematical model is studied, ground of accepted precondition, proof of convergence of used optimization algorithms, stability of designed systems and others. Precise task of design formulation and grounds of man-made assumptions, selected lead and problem solving method must precede theoretical researches. Special attention must be paid to the range of application of the results.

In the case of the implementation of theoretical researches and calculations where the methods are well documented, the text of the thesis should be list precise references to the appropriate sources and be given the essence of those methods.

In a case the thesis author develops original methods, substantive supporting arguments for the method must be provided.

Thesis work which, results in a concrete application, product or study process is considered to contribute something new to existing knowledge and is therefore substantive.

10. THESIS WORK EVALUATION AND REVIEWING

Completed thesis work signed by the student and consultants must be submitted to the thesis supervisor by 15-16th of May. The supervisor ensures that all required documentation is complete and issues a report on the implementation of all stages of the thesis. The supervisor should then sign the thesis and submit it together with his report to the head of the department. When a student has completed his thesis in a partner university all materials should be submitted to the native department by May 20.

The head of department reviews evaluates and reviews the thesis and submits the thesis to the examining board informing the student of the details of the review.

11. THE THESIS WORK DEFENCE

The final stage of the M.Sc. program is the defence of the thesis before the examining board and this stage takes place between June 1 and June 15.

The new scheme introduces a clear set of criteria for evaluating the thesis, which is available to all parties participating in the program. This set of criteria should be used in the evaluation of the thesis at all stages both by the individual student and in the seminar group discussions. The set of criteria ensures that the final evaluation is impartial and ensures that the student has the best possible chance to successfully defend his thesis.

Students must fulfil all the requirements of the curriculum before being permitted to defend his thesis before the examining board. The student can defend his thesis once the thesis together with the review is presented to the examining board. The student should be acquainted with the examining board working schedule a month before the beginning of the thesis work defence. Students can obtain this information at the studies office.

Besides the completed thesis work the following papers should be produced for the examining board:

- the dean's reference about the student's curriculum implementation and received marks description of student's activity during his studies at the university;

- the thesis work supervisor's comments;
- the thesis work review.

Also other papers, describing the scientific and practical value of the performed thesis work, may be produced for the examining board including:

- published articles related to the thesis work topic;
- documents proving the practical use of the elaboration – the reality certificate signed by officials.

The order of the thesis work defence is suggested as the following. A student can defend his thesis if at least half the examining board members are present.

The defence of a thesis should not be longer than 45 minutes. The reference relating to the student's curriculum implementation should be announced before the defence. The student has 20 minutes to make his thesis presentation. The presentation is preceded by an introduction. During the presentation the student should describe the current state of the problem, concisely formulate the task, indicate the method(s) used, describe the results achieved during the thesis work implementation and outline the abilities of their usage. After the thesis work presentation the student will answer the questions of the examining board members and other people present at the meeting. Then the thesis work review and the supervisor's comments are announced. The student has the opportunity to answer to the reviewer's remarks. After the examining board has listened to the presentation, it evaluates the thesis work and makes a decision about awarding the M.Sc. qualification to the student.

The preparation of his defence should provide a versatile evaluation of the knowledge, skills and acquirements, professional and human qualities of the future master of science. They should correspond to the qualification description regulations.

Quick wit, bravery of thinking, decision making ability, personal opinions, the ability to analyse engineering solutions, initiative, and the ability to produce concise, clear, logical views in written form are taken into account when evaluating the thesis.

If the thesis is considered to be original in content and of profound scientific interest then the board can recommend the thesis for publication and recommend the student to write a Ph.D. thesis. If the student does not agree with examining boards decision he can appeal to the rector. If the rector upholds the student’s appeal he can, in accordance with established procedure, call special board meeting. The student repeats his presentation before the special board. The special board makes a final

decision. The special board uses the same evaluation set of criteria as the examining board.

12. REGISTRATION AND STORING OF M. SC. THESES

Following the successful defence of a thesis before the examining board the student should submit his thesis for storing. Submissions must be made to subdivisions of the university i.e. the archive, library and department. Maintaining a database of M.Sc. theses in the departments is new innovation in the scheme and provides new students with valuable knowledge to help them design and complete their own thesis.

The student is required to provide:

- electronic (programs, databases) and graphics materials (posters) to the archive;
- files with theses on the Web-server at the department;
- theses with reviews to the university library.

MANUAL FOR SUPERVISING, REVIEWING AND EVALUATING OF M.SC. THESIS

1. INTRODUCTION

The present manual describes the common requirements for M.Sc. thesis work management organization, thesis reviewing, and principles of state board's working in compliance with current normative and technical documents that describe the M.Sc. curriculum.

This manual is aimed to provide a unified approach to the requirements of M.Sc. thesis work management organization in the departments of the university. It introduces new principles of working with students and it promotes the perfection of current M.Sc. thesis work system on the basis of Ukrainian and foreign universities' positive experience.

The manual is generic to all specialities in the university, and is to be used to provide methodical help for the departments' workers who supervise thesis work, review theses and participate in the state board's work.

2. OBJECTIVES AND TASKS

The process of M.Sc. preparation consists of a great number of different types of educational work. The final outcome is M.Sc. degree thesis work implementation by student. Experienced capable guidance is required to ensure the smooth running of the program and clear evaluation criteria is required to ensure objective, impartial decisions by the examining board.

Thus, supervision of students by leading professors or leading scientists of a department is an essential part of the thesis work. Supervising is required to guide research in the necessary direction, to determine and correct obvious defects and weak points, to enable students to maximise their potential.

Reviewing is also an important task within the program. An external reviewer is selected from scientists of the native or other department or representative of an external enterprise is selected. The reviewer should be

acquainted with the theoretical and pragmatic results of the M.Sc. thesis work. Appraisals should be submitted in written for by reviewers. The main task of the reviewer is to provide impartial analysis of student's research implemented during the thesis work. This review must be based on the stated criteria.

The State board is called before the public defence of M.Sc. thesis work implemented by the defending student. The State board's work is to evaluate the student's ability to uphold his work's results, professional skills, the ability to conduct independent research within the chosen field. The State board's members may ask questions. The State board executive secretary is responsible for keeping an electronic version of the thesis on the department.

3. RECOMMENDATIONS TO THE SUPERVISOR

The supervisor has the right to devote about forty hours of his working schedule for the seminar on research leads presentation.

The supervisor is obliged to present the research leads, to work with student groups during seminars, to lead practice work and produce practice reports, to produce a review of the trial defence and evaluate the completed theses according to the evaluation criteria.

The Master of Science degree is a qualitatively new phase of the educational process. It demands completely new independent scientific research organization principles. The main principle that should be taken as a key point in the M.Sc. education development is the principle of academic independence. Within the framework of this project this will ensure that the student has freedom of choice in topic selection, research methods and has greater access to constructive academic critique via his supervisor and fellow students. Departments should organise seminars in which potential supervisors present their research leads. Potential supervisors should give a short presentation before students, listing his main scientific interests and providing further perspectives of research areas.. At that time students may ask necessary questions and lecturers of the department may elucidate in detail, topics which interest the audience. Such seminars must be held by September 15 of the last academic year.

During the implementation of thesis work groups of students together with their supervisor participate in different subject seminars. Supervisors must take an active role in these seminars evaluating objectively the issues presented. Seminars take the form of discussion groups. This is a new concept for the Ukrainian education system. In the seminar each student presents his thesis topic and the other students discuss the merits and shortcomings of the topic. If after the discussion some issues remain unclear or unresolved the supervisor facilitates a resolution and at the conclusion of the seminar the supervisor informs students of his evaluation and effectiveness of the seminar. Initial seminars will be held by October 1 and the main purpose of the seminar is student selection of thesis topics. Supervisors are there to assist students with topic selection, answering questions and providing research insight but the decision of topic choice rests with the student in line with the academic independence principal.

Group discussions are an important new innovation in the scheme. Groups are formed after students' make a choice on their supervisor on the basis of four or five students for one supervisor. If a student wishes to work with a supervisor who's list is already full he can do so if an agreement with another supervisor with free places can be achieved.

Formed groups of students participate in seminars with the chosen supervisor to discuss all stages of the thesis. This process allows students to benefit from the knowledge and experience of both their supervisor and fellow students. This process maximises the student's potential to successfully complete and defend his thesis. As stated the first seminar is to enable students to select a thesis topic. 4 hours are allotted for the supervisor in his work time-table for this seminar. Students continue to attend seminars. Once students have selected a thesis topic they must present a written proposal of objectives and research methods for their thesis at a group seminar. The supervisor, together with other students, offers constructive criticism. The supervisor then evaluates the proposal, corrects it if needed and submits the approved topic to the department secretary who then submits it to the dean's office by October 10. Students can change topics but the new topic must be one of the selected supervisors research leads.

The supervisor continues to participate in seminars together with assigned students until the end of the Autumn term. These seminars include discussing and approving of explicit formulation of thesis work task. Also students report on analysis

of literature connected to their thesis topic. The supervisor may give references to essential basic literature, information related to normative materials, provide other sources on the theme of the research topic of the future thesis work (science magazines, articles, etc.).

The supervisor may render the student assistance in choosing a place in which he will take his thesis work practice. The supervisor in the university is responsible for the thesis work implementation process, and assists the student in designing his planned schedule. After practice implementation the supervisor evaluates and produces a report on the thesis practice. Furthermore, the supervisor must use explicit appraisal criteria for report evaluation.

If a student takes his thesis work practice in an external organization he should select a supervisor there. Only leading researchers or scientists can be supervisors of a M.Sc. thesis work practice. The supervisor must maintain practice diary and sign a report on the student's thesis practice. After finishing the thesis practice the external supervisor should produce a short summary. The summary should contain an appraisal of the student's professional and practical skills and his future M.Sc. availability for independent work on scientific or practical projects.

Throughout this stage, the supervisor must continue to conduct seminars, which should be devoted to thesis work implementation. If the student takes his thesis practice in an external organization, these seminars are held there by the external supervisor. At the conclusion of this stage, students present their completed theses to a consultant in the speciality and his supervisor. The supervisor produces a review on the completed M.Sc. thesis work. Furthermore, the testimonial is composed according to appropriate criteria (see evaluation criteria for M.Sc. thesis).

The supervisor should reflect in his review the following points:

- novelty of thesis work topic and its complexity ;
- the student's ability to work on scientific, technical and pertinent literature;
- the independence of the student's work, student's initiative, his ability to profit by modern methods and research means, his ability to use computer equipment, utilization of standards and other normative documents;
- the student's attitude to his M.Sc. degree work, ability to work systematically, his accuracy and literacy.

At the end of the review the supervisor notes his conclusions about the student's preparedness to perform independent scientific activity and defend his thesis.

The completed thesis signed by the student and the consultants is submitted to the supervisor. The supervisor checks that the thesis fulfils the initial design requirements, produces a description of the thesis work completed by the student and signs the thesis.

4. RECOMMENDATIONS TO THE REVIEWER

External reviewers should be invited from among specialists of enterprises and scientific institutions. The dean at the suggestion of the heads of the respective departments approves a list of suitable institutions. Lecturers from other department or higher educational establishments may also be engaged as reviewers.

The external reviewer independently appraises the results of student's thesis work utilizing the explicit evaluation rules.

The main contents of the review should consist of the results of the fundamental analysis and thesis work assessment. The following questions should be elucidated:

- adequacy of the thesis work to its task;
- actuality and scientific value of the thesis work topic;
- evaluation of commensurability of parts and size of thesis;
- assessment of all thesis materials' content;
- validity of the thesis' scientific and engineering decisions;
- completeness of review of scientific and technical literature and ability to cite it;
- scientific and technical level and quality of calculations, decision of optimisation of tasks;
- appraisal of accuracy of standard utilization;
- range and expediency of pragmatic investigations, evaluation of results;
- possibility to apply the outcomes of the thesis work in part or as a whole;
- appraisal of thesis statement style and conformity of design to standard requirements;
- mistakes and defects of completed thesis work.

The reviewer should assign a final mark according to the evaluation criteria (see evaluation criteria for M.Sc. thesis).

The review is signed by reviewer and is enclosed with the thesis.

5. RECOMMENDATIONS TO THE CONSULTANTS

The student selects a consultant in his speciality and a consultant in economics for his thesis work. During the stage of research in the chosen field of science and of thesis writing the consultants conduct seminars. In the course of these meetings consultants become acquainted with the preliminary results of the thesis work, drafts of the thesis and make recommendations concerning further progress.

At the conclusion of this stage students present their completed theses to the consultant in the speciality and their supervisor. The consultants may counsel students and caution against wrong decisions. Consultants should check corresponding part of thesis work done by student and attest it by signature.

6. RECOMMENDATIONS TO THE EXAMINING BOARD

Following papers should be presented to state examining board before defence:

- dean's reference about student's curriculum implementation and marks achieved;
- reference for student's activity during his university education;
- reference from supervisor;
- review of thesis work.

Other materials characterizing the scientific and practical value of the completed M.Sc. degree thesis work may also be presented to the examining board such as:

- published articles on the thesis work topic;
- papers which indicate practical utilization of thesis work – reference about reality, signed by official persons, etc.

The student presents his completed thesis work to the state examining board during the examining board's session, organized in accordance with schedule produced in advance. In the course of presentation examining board members may ask for clarification of points connected with thesis topic themes.

Upon completion of the thesis defence presentation the examining board evaluates the thesis work in closed session taking into account student's study results and in accordance with to the appropriate criteria which excludes the influence of subjective opinions of board's members. The board makes a decision about assigning M.Sc. degree to the student.

The appraisal should be take into consideration the boldness of mind, presence of proper point of view, ability to guide science analysis and research within chosen field, initiative, breadth of views, as well as ability to express ideas in written form and the ability to make logical generalizations.

The examining board evaluates the M.Sc. theses according to the criteria, utilised by the supervisor and reviewer (see Evaluation Criteria for M.Sc. Thesis).

The special board, which can be summoned by the rector if he upholds students' appeal against the examining board, will utilise the same evaluation criteria as the examining board. Special board consists of leading scientists of the university.

If the M.Sc. degree thesis work is original and of pronounced interest, the examining board may make a decision to recommend the thesis work results for publication and the student to post-graduate study.

THE MANUAL FOR MANAGEMENT STUDENTS' M. SC. THESIS WORK FOR UNIVERSITY SUBDIVISIONS

1. INTRODUCTION

The present manual defines the requirements for management of the students' M. Sc. thesis work for the various university subdivisions. They play an important role during organising the M. Sc. thesis work. The subdivisions are responsible for providing everything required ensuring the smooth running of the thesis work management. The university subdivisions involved to the M.Sc. thesis work management are the native department, the Dean's office, the Studies office, archives and the library.

The present manual is intended to improve the thesis work organisation using the positive experience and also to bring the Ukrainian thesis work organising process up to European standards.

The manual is intended to be generic for all specialities and to provide a methodical aid for departments and other university subdivisions participating in thesis work organisation.

2. OBJECTIVES AND TASKS

The M. Sc. thesis work is the last stage of the M. Sc. degree preparation. The M. Sc. thesis implementation, its presentation and defence are the most important points of a student's attendance at the university.

The effective thesis work organisation is given to the university subdivisions. The department should provide students with the necessary methodical materials. The Studies office is responsible for the designing the timetable, providing the thesis work organisation process with lecture rooms. The Dean's office's task is to see to students' studying process and thesis works implementation. The library and the archive are responsible for providing students with the necessary literature and for storing completed theses.

3. INSTRUCTIONS TO THE DEPARTMENT

3.1 Duties

The department should submit the teaching load to the studies office. At the beginning of the ninth term the native department must arrange a seminar professors to present their research leads. Also the department should fix the chosen topics and give them to the dean's office. The department should account the external thesis works and reviews from the partner university. The head of the department should permit students to defend their thesis if all the requirements are met. After the thesis work defence the department must register and keep the works in electronic form for 10 years.

3.2 The supervisor selection for the thesis work

A new practice in Ukraine is arranging a special seminar. The native department professors present their research leads during such seminars. The native department is given a responsibility to arrange such research seminars by September 15.

The rector appoints the M.Sc. thesis supervisors according to proposition of the native department from leading professors of the university.

3.3 The thesis work topic approval

The department should ensure that the thesis work topic is actual, scientifically ponderable, to reflects real practical requirements. Also one of the department employees should check that all new topics are different from thesis topics of previous years.

The rector of the university signs an order to assign the thesis topic to a student according to the student's written application before sending him to the M.Sc. thesis practice.

After the preliminary topic selection the department should fix the topics by October 1. The department then accepts the changed topics from students by October 31. If a student is exchanged to a partner university, he sends his thesis work topic to the department. The native department should fix the changed topics and give them to the dean's office by November 10.

3.4 The preparations for the thesis work implementation

The native department should provide the students with all necessary methodical materials on the M.Sc. thesis work before the beginning of the thesis work.

A special corner (table) related to the thesis work organisation should be created at the department. There should be seminars, consultations, examining board meetings timetable, the recommended standards, the thesis work design example, etc. The information should be presented in a form that suits both the students and the thesis work supervisors.

3.5 The preliminary thesis defence

After finishing the implementation stage of the thesis the students proceed to the preliminary defence of their thesis works. The preliminary defence takes place in the native department. During the preliminary defence the students present their thesis works and answer questions. All the students should take their preliminary defence by May 25.

If a student is exchanged to a partner university, he writes his thesis work there. He should then submit his work to the department by May 20.

Independent external reviewers are invited to review the theses. The list of the reviewers is approved by the dean of the faculty according to the propositions of the native department.

The native department makes a list of the students who have met all the requirements and who are permitted to defend their theses. That list should be given to the dean's office by May 31.

3.6 The registration and storing the M. Sc. Theses

Theses should be registered in the native department following successful the defence. It should be done during the two weeks following the day of last defence. Files with the thesis works are kept in electronic form. An ordered directories system for each year is created on one of the department computers. The thesis works are kept for 10 years. This allows for access of results, which were received during the thesis work organising, in future scientific work and researches held within the department research area.

4. INSTRUCTIONS TO THE DEAN'S OFFICE

4.1 Duties

- to register thesis topics;
- to account for all courses (from home or partner university) and permit students to thesis practice;
- to prepare the order on thesis practice;
- to account thesis practice (from home or partner university) and prepare the order on thesis work implementation.

4.2 Registration of thesis topics

The Dean's office should register all approved topics for thesis work by November 15. Department submits list of topics to the Dean's office.

4.3 Permission to thesis practice

The Dean's office registers the courses and examinations passed by students. If a student is exchanged to a partner university the dean's office should account all courses and projects if the student submits supporting documents (see the set of manuals for accounting credits for courses and projects). If a student has performed all requirements to M.Sc. thesis program then the dean's office should permit him to thesis practice. The deadline for practice permission is December 31.

4.4 Thesis work practice and permission to perform a thesis

The student has the right to take his thesis work practice at the home university or in an external organization. If the student is exchanged to a partner university he has the right to take his thesis work practice there.

In the case of taking practice outside the home university the dean's office should register a new place for practice if the student submits a supporting letter from the external organization or partner university by January 10.

The dean's office should prepare the order on thesis work practice. The order should contain the list of students who are permitted to thesis practice, topics of their theses and place where the practice will be implemented. The rector of the home

university should sign the order. The dean's office should submit the order to the rector's office by January 12.

If student has performed all the requirements for thesis practice, and has given a report and practice journal signed by his supervisor from the home university and the supervisor from the external organization (if practice was implemented outside the university), the dean's office should account the thesis practice by March 15.

For accounting thesis practice from a partner university the student should send his report by mail. The Dean's office accepts these reports until March 10.

The dean's office should compose a list of students who passed practice successfully and prepare an order on thesis work implementation. This order should be submitted to the rector's office by March 20.

5. INSTRUCTIONS TO THE STUDIES OFFICE

5.1 Duties

- to design the schedule of lectures, seminars, presentations, defences;
- to put 40 hours for every supervised M.Sc. student to supervisor's teaching hours.

5.2 Schedule composition

Students attend lectures according to the M.Sc. curriculum during the autumn term. The Studies office should take into account the new practice of reading block lectures (See **2.4.1** General scheme for management of students' M.Sc. thesis work) while composing the studies schedule.

One innovation for Ukraine is holding research seminars. The Studies office should also take into account these hours.

6. INSTRUCTIONS TO THE LIBRARY

6.1 Duties

- to provide students with literature;
- to keep the paper theses.

6.2 Providing with literature

During thesis work the library should provide students with necessary literature. Also students can read M.Sc. theses of preceding years.

6.3 Storing of theses

Printed theses with reviews should be registered after defence and kept in the university library for 10 years.

7. INSTRUCTIONS TO THE ARCHIVE

7.1 Duties

- to register and keep electronic and graphical materials.

7.2 Keeping materials

M.Sc. theses can contain some electronic materials (developed software, data bases, etc.) or graphical materials (posters, slides). In such cases the archive should register and keep them for 10 years.

CONCLUSION

This scheme of managing the M.Sc. thesis works was designed for greater integration of the Ukrainian education process into the European educational system.

The new scheme of managing the M.Sc. thesis works provides a number of innovations. The main ones are the inclusion of the academic independence principle, students group work, accounting of all external courses and the integration of thesis practice and theoretical work. During the stage of registration the completed thesis work is archived and submitted for storage in the corresponding university subdivisions. Keeping documents in the department is introduced into practice in accordance with the new scheme. Such a practice allows students to utilise the results of previous theses, in future scientific research within the department.