UNIVERSITY OF MISKOLC
Faculty of Materials Science and Engineering
Antal Kerpely Doctoral School of Materials Science and Technology

EDUCATION PLAN

Doctoral School: 33

Approved by the Doctoral Council with the resolution No. 30/2019.(IV.01.)

April 1, 2019.

The educational plan of the
Antal Kerpely Doctoral School of Materials Science and Technology

	Educational and research phase				**Research and dissertation phase**				**Total**
	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	
Number of core courses	min. 1 max. 2	min. 1 max. 2	min. 1 max. 2	-	-	-	-	-	**4/5**
Credits/subjects	10	10	10						**40/50**
Art of doing science	2	-	-	-	-	-	-	-	2
Scientific database management	-	2	-	-	-	-	-	-	2
Complex planning	-	-	-	25	-	-	-	-	25
Research Seminar	1	1	1	-	1	1	1	1[1]	6/7
Credits/Seminars	15	15	15	-	20	20	20	20	In the first 2 years 45 credits, in the second 2 years 60/80 credits
Number of optional subjects	max. 2	max. 2	max. 2	-	-	-	-	-	max. 6
Credits/optional subjects	2	2	2	-	-	-	-	-	max. 12
Publications credits	min. 10 credits								min. 55 credits
Participation in institutional research	2	2	2	-	5	5	5	5	max. 26
Teaching activity hours/semesters	max. 5	max. 5	max. 5	-	max. 5	max. 5	max. 5	max. 5	max. 30
Credits/hours	max. 5	max. 5	max. 5	-	max. 5	max. 5	max. 5	max. 5	max. 30

[1] *the 7th Research Seminar can be replaced by the 'home defense'*

Provisions to the publication activity.

1. The following credits can be given for the publication activity – on the basis of the copy of the article or the conference program submitted to the Doctoral Educational Committee:
   - international qualified journal article
     - published article in Q1 journal 40 credits
     - published article in Q2 journal 30 credits
     - published article in Q3 journal 20 credits
     - published article in Q4 journal 10 credits

     Q1-Q4 categories from the Scimago are accepted by the Educational Committee (that ranking will be accepted which is better for the author: rank of the publication year or the year of the submission of the paper – it has to be mentioned in the published article).

     In these categories only the first author get credits. In case of the other categories the credits are independent of the number of co-authors.
   - reviewed article published in non Q ranking journal 6 credits
   - Hungarian journal article in foreign language 6 credits
   - article in Hungarian journal 4 credits
   - foreign language article in international conference book 5 credits
   - presentation on international conference 4 credits

2. Only those articles can be into account which are available publicly in printed or in electrical form.

3. An article is considered to be a publication with at least 4 pages in print and standardized outline – introduction, experiments, results, conclusions, references). This condition does not apply to scientific journals Q1 and Q2.

4. The Doctoral School
   a. make no distinction between oral presentation and poster, both of which are credited according to the 'presentation'
   b. in case of registered patent 10 credits available
   c. in case of handed in patent 4 credits available the Council recognize those conferences as international where the majority of the participants are foreign, the language of the presentation are English, German or Russian but not Hungarian.

5. It is expected that the PhD student collects at least 90 credits until the complex exam, among this at least 10 credits should be in publication (articles, presentations). During the entire four-year training period minimum 55 credits must be earned from publications.

6. The electronic and printed published articles shall be awarded the same credit.

7. The doctoral dissertation procedure shall take into account the data in the MTMT database in the evaluating the scientific publishing activity. The publishing activity shall

be demonstrated by the data contained in the MTMT. Those scientific works that are not included in the MTMT database shall not be taken into account in the evaluation of the scientific publishing activities of the lecturers, researchers or PhD students.

Conditions for Postdoctoral Fellowships and Postgraduate Studies

Admission requirements

1. Applicants must meet the general requirements for admission as specified in Section 1 of Annex 16 of the University Doctoral Regulations.
   a. You can apply every year not later than the central defined date by filling the downloadable form from the website of the Unviersity or the Doctoral School and attaching the necessary documents in accordance with the above regulation,
   b. applications must be submitted to the Secretariat of the Vice-Rector for Research and Inernational Relations who send them to the Chairman of the Doctoral Council,
   c. The Chairman of the Doctoral Council appoints and invite the chairman and members of the selection committee an, in consultation with them informs the candidates about the time and place of the oral examination
   d. The Selection Committee takes an oral examination with the candidate and ascertains the candidate's profeessional knowledge, conception of his/her doctoral work, previous scientific activities and knowledge of languages
   e. The Committee uses the attached score sheet and grades the candidate's performance up to 100 points and rank them after these points. Then the Committee recommends or not recommends their admission. For the admission at least 60 points are required but it does not mean the automatic admission
   f. The Doctoral Council proposes the admission according to the scholarship limits received from the University Doctoral Council and other possibilities and capacities of the Doctoral School. The final admission is decided by the University Doctoral Council.

I. Educational and research phase

Provisional, must be submitted credits before the complex exam:

1. Four core subjects – 4 x 10 = 40 credits
2. Two optional subjects (*Art of doing science and Scientific database management*) must be fulfilled – 2 x 3 = 4 credits
3. Fulfilling the Complex planning subject - 25 credits
4. Publishing activity - min. 10 credits
5. Three research seminar - 3 x 15 = 45 credits

Must be completion **at least 90 credits**
Can be accomplished by the aboves: *124 credits*

Credits in excess of required credits:

1. Completion of elective courses - max. 3 x 2 = 6 credits
2. Participation in institutional researches - max. 3 x 2 = 6 credits
3. Participation in education - max. 3 x 5 = 15 credits

II. Research and dissertation phase

Conditions for starting the II. phase:

1. During the educational and research phase in the first four semesters must be completed 120 credits, including all study credits
2. Completing the complex exam

Required credits needed to the final certificate

1. Four research seminars - 4 x 20 = 80 credits
   (the last one can be replaced by the 'home defense'
   with no credits, in this case 3 x 20 = 60 credits)
2. Publication performance - min. 45 credits

Must be completion **at least 240 credits**
Can be accomplished by the aboves: *125 credits*

With the compulsory credits can be completed altogether in the I. and II. phase:
124 + 125 = 249 credits

Credits beyond required credits:

1. Participation in institutional researches - max. 3 x 5 = 15 credits
2. Participation in education - max. 3 x 5 = 15 credits

Annexes

1. Credits in the Antal Kerpely Doctoral School
2. Rules of the complex exam and application form
3. Subject list
4. Rules for evaluation of research seminars and score sheet

Annex 1.

Credits in the
Antal Kerpely Doctoral School of Materials Science and Technology

Items	Credits
Obligatory **courses** (4 of them):	10 each
Art of Doing Science course	2
Scientific database management course	2
Research Seminar in the 1st 4 semesters, 3 is needed for the complex exam	15 each
Research Seminar in the 2nd 4 semesters, at least 3, maximum 4	20 each
Teaching activities – need to enclose the proof of the lecturer	5
Participate in **research work** of the institute, enclose the report of the executed tests	
during the 1st 4 semester	2
during the 2nd 4 semester	5
Publications* – enclose copy of the submitted article or programs of the conference	
prestigious international journal	
- publication in Q1 ranked journal	40
- publication in Q2 ranked journal	30
- publication in Q3 ranked journal	20
- publication in Q4 ranked journal	10
Reviewed article published in non Q ranking journal	6
Hungarian journal, but not in Hungarian	6
international conference article not in Hungarian	5
international conference presentation (oral or poster) not in Hungarian	4
Hungarian conference article not in Hungarian	3
Hungarian conference presentation (oral or poster) not in Hungarian	2
* Only those articles can be rewarded with credits which have been already accepted and published, can be seen either in electronic or in printed version. The articles must be at least 4 printed pages and have to be divided into introduction, experiments, results, conclusion and list of literatures.	
Patent	
Registered patent	10
Submitted patent	4

Annex 2.

Rules of the complex exam

1. **Prerequisites for the complex exam:**

90 credits compilation by the followings:

- examinations of the four compulsory and optional subjects
- three research seminars
- at least 10 credits from the publication

2. **Application for the complex exam**

A. At the beginning of the current semester Student has to take the subject 'Complex Design' in NEPTUN System (subject responsible is the student's supervisor or the head of the research field, or the head of the Doctoral School) and acquires the signature at the end of the semester. The prerequisite of the signature is the preparation of the scientific research report and plan, its submission in writing and oral presentation

B. Students have to complete the application form and collect the attachments (credit certificate, MTMT data, supervisor's recommendation) and submit them by the end of the semester to the Dean Office in 1 printed and 1 electronic version
   - The certificate about the acquisiton of 90 credits shall be issued by the Dean Office with the signature of the Head of the Doctoral School
   - MTMT general table or Google Scholar profile with the reference datas of the publications printed from the MTMT or Google Scholar, endorsed by the candidate
   - Supervisor's recommendation
   - Scientific research report and plan

3. **The date of the Complex Exam** is assigned by the Council of Doctoral School and it is made public prior 2 weeks of the exam.

4. **The Complex Exam must be completed in Hungarian** (in case of Hungarian students) **or English.** If a non-Hungarian speaking student applies for the Complex Exam, all elements of the exam can be completed in English (the candidate has to declare it on the Application Form).

5. The Complex Exam consists of two main parts:
   - **Theoretical part:**
     The PhD student gives an account on his/her knowledge in the scientific literature of the discipline, his/her current theoretical and methodological knowledge. He/she takes and examination in at least two subjects (subject list is attached)
   - **Dissertation section**:
     The PhD student reports on his/her research results, outlines his/her research plan for the second phase of doctoral training as well as timetable for preparing the dissertation and publishing the results. The scientific research report and plan shall be presented by the PhD student in writing before the exam and in oral presentation.

6. The Complex Exam must be taken in public before a committee. The examining board consists of six members and at least one third of members are not in employment with the institution which operates the Doctoral School.
    a. The Examination Board is appointed and invited by the Doctoral Council within two weeks after the deadline of application for the exam.
    b. The chairman of the Examination Board is a university professor or habilitated associate professor, habilitated college professor, professor emeritus or doctor of science, doctor of the Hungarian Academy of Sciences of the Unviersity of Miskolc.
    c. All members of the Examination Board have scientific rank. The candidate's supervisor can not be the member of the Board but is required to evaluate the PhD student's work in writing and oral in advance.
    d. Subject responsible persons are not members of the Examination Board but they help its work. The reviewer is also not member of the Board who is preferably the same as the research seminar reviewer. The reviewer prepares a written review in advance, his/her personal presence is not a prerequisite for passing the complex exam.

7. The preliminary written assessment of the supervisor must be attached to the application form for the complex exam. The evaluation presents the doctoral student's work to date, his main scientific achievements, and his collaboration with the supervisor. He declares whether he recommends the student to continue his doctoral studies. The supervisor evaluation is at least one A/4 pages.

8. Requirements of the PhD student's scientific research report are the same in terms of size and form as the research seminar paper.
    a. On the cover of the report the name of the Doctoral School, the name of the PhD student and the supervisor, as well as the institute shall be indicated.
    b. The report should be prepared in A/4 size with 12 font size, 1.5 line spacing at least 20 and maximum of 30 pages.
    c. Tables and figures shall be sequentially numbert and titled. It is necessary to make a reference list and also could be annexes. The reference list should be prepared in the usual form of the fiels.

9. The theoretical and dissertation part of the complex exam is evaluated separately. About the complex exam a detailed minute is prepared including a textual evaluation of the PhD student's work wich is validated on scientific aspect, and signed by the members. The result of the exam must be announced on the day of the oral exam.

Evaluation of the complex exam:

A. The Examination Board evaluates the theoretical and dissertation parts of the exam separately and decides its approve by 1-5 scores. The complex exam is successful if the candidate reaches at least 60% of both sections. The assessment has two stages: pass or fail.
B. The result of the exam must be announced on the day of the oral exam. The minute of the exam must be submitted in full to the Vice-Rectos of Scientific and International Secretariat.

C. The minute contains:
   - The name and identification number of the institute
   - The name, student identification number, previous level of education and professional qualification of the PhD student
   - The name and lecturer identification number of the supervisor
   - The discipline of the degree to be awarded
   - The questions asked in the complex examination and the classification of the answers
   - The qualification of the complex exam
   - The name and lecturer identification number of the chairman and members of the complex examination board.

10. After the successful completion of the exam, the PhD student may continue his/her studies. If the exam fails, the PhD student may take the exam once more at a given time in the current semester. If the PhD student does not pass the complex exam the legal status will be terminated on the day of failure or unsuccess.

(1837-1907)

APPLICATION FORM
to
Complex Exam

University of Miskolc, Faculty of Materials Science and Engineering
Antal Kerpely Doctoral School of Materials Science and Technology

Personal data	
Name	
Birth place and date	
NEPTUN code	
Title of the doctoral theme	
Supervisor(s) name	
Theoretical part: two subjects name and NEPTUN code	
Dissertation part: choosen language (underlined)	Hungarian / English

Attachments to the application form	
Credit certificate (90 credits)	Issued by the Dean Office with the signature of the Head of the Doctoral School
MTMT general table or Google Scholar profile with the reference datas of the publications printed from the MTMT or Google Scholar, endorsed by the candidate	Must be submitted at least by the end of the semester
Supervisor's recommendation	Must be submitted at least by the end of the semester
Scientific resesearch report and plan	Must be submitted at least by the end of the semester

Miskolc, ……

.....
signature of the student

I know the supervisor tasks related to the complex exam and I support the application.

Miskolc, ……..

……
signature(s) of the supervisor(s)

Annex 3.

Subject list

Topic and Leader	Name of course	Lecturer	Neptun code of English course	Semester (fall or spring)
1. Chemical Metallurgy **Prof. Dr. Tamás KÉKESI**	Surface technologies	Prof. Dr. Török Tamás	MAKDKM1EN	Spring
	Chemical Metallurgy-I	Prof. Dr. Török Tamás	MAKDKM2EN	Spring
	Theoretical Fundamentals of Chemical Metallurgy	Prof. Dr. Kékesi Tamás	MAKDKM3EN	Spring/Fall
	Processes of Metal Extraction and Refining	Prof. Dr. Kékesi Tamás	MAKDKM4EN	Spring/Fall
2. Foundry Engineering **Dr. Jenő DÚL**	Theoretical basics and simulation of foundry processes	Dr. Molnár Dániel	MAKDÖN1EN	Spring
3. Interfacial phenomena and nano-technology **Prof. Dr. György KAPTAY**	Art of Doing Science	Prof. Dr. Kaptay György	MAKDHN1EN	Fall
	Bulk and Interfacial Equilibrium of Materials	Prof. Dr. Kaptay György	MAKDHN2EN	Spring/Fall
	Nanotechnology	Dr. Baumli Péter	MAKDHN3EN	Fall
4. Plastic deformation of metals **Prof. Dr. György KRALLICS**	Theory of metal forming	Prof. Dr. Krállics György	MAKDFK1EN	Fall
	Hot forming	Prof. Dr. Krállics György	MAKDFK2EN	Spring
	Cold Metalforming Processes	Dr. Kovács Sándor	MAKDFK3EN	Spring
5. Physical metallurgy and heat treatment **Prof. Dr. Valéria MERTINGER**	X-ray diffraction methods	Prof. Dr. Mertinger Valéria	MAKDFH2EN	Spring
	Metal Matrix Composites	Prof. Dr. Gácsi Zoltán	MAKDFH3EN	Fall
	Solide State tansformation	Dr. Gergely Gréta Prof. Dr. Roósz András	MAKDFH4EN	Fall
	Solidification	Prof. Dr. Roósz András Dr. Veres Zsolt	MAKDFH5EN	Fall
6. Materials informatics **Prof. Dr. Zoltán GÁCSI**	Image analysis	Prof. Dr. Gácsi Zoltán		Spring
	Non conventional computation in image analysis	Dr. Barkóczy Péter	MAKDIA2EN	Spring
	"Applications of computer algebraic systems"	Dr. Körtesi Péter	MAKDIA3EN	Spring/Fall
	Anisotropy examinations	Dr. Benke Márton	MAKDAI4EN	Fall
	Scientific database management	Kissné Dr. Svéda Mária	MAKDAI5EN	Spring
	Modern artificial intelligence and material science application	Dr. Tóth-Lukács Pál		Fall
7. Space materials and technology **Prof. Dr. Pál BÁRCZY**	Materials science in space	Dr. Bárczy Pál prof.emeritus		Spring
	Numerical simulation processes	Dr. Barkóczy Péter		Fall
8. High temperature equipment and heat energy utilization **Prof. Dr. Árpád Bence PALOTÁS**	Combustion Theory and Gasification Theory	Prof. Dr. Palotás Árpád Bence	MAKDEN1EN	Spring/Fall
	Transport processes	Dr. Tóth Pál	MAKDEN2EN	Spring/Fall
	Test methods for refractory materials	Dr. Póliska Csaba	MAKDEN3EN	Spring/Fall
	Transmission processes of airpollutants	Dr. Szűcs István prof. emeritus	MAKDEN4EN	Spring/Fall
9. Ceramics and their technologies **Prof. Dr. László A. GÖMZE**	Mechanics and Processing of Ceramics	Prof. Dr. Gömze A. László	MAKDKE1EN	Fall
	Constructional materials, silicates and glasses	Prof. Dr. Gömze A. László		Fall
	3. Technology of composites materials	Prof. Dr. Gömze A. László	MAKDKE2EN	Fall

Topic and Leader	Name of course	Lecturer	Neptun code of English course	Semester (fall or spring)
10. Polymer technology **Prof. Dr. Kálmán MAROSSY**	Physics of Polymers	Dr. Marossy Kálmán prof. emeritus	MAKDPO1EN	Spring/Fall
	PVC materials	Dr. Marossy Kálmán prof. emeritus	MAKDPO2EN	Spring/Fall
	Rheology of Polymers	Prof. Dr. Czél György	MAKDPO3EN	Spring
	Introduction to the Chemistry of Polymers	Dr. Szabó Tamás	MAKDPO4EN	Spring/Fall
	Plastics Processing Technology	Prof. Dr. Belina Károly	MAKDPO5EN	Fall
11. Chemical processes and technologies **Prof. Dr. Béla VISKOLCZ**	Selected topics of petrochemical and organic chemical technologies	Dr. Fejes Zsolt	MAKDKF1EN	Spring
	Sorption and catalysis	Dr. Lakatos János	MAKDKF2EN	Spring/Fall
	Molecular Simulations of Complex Systems, Molecular Design and Calculations of Thermochemical properties	Dr. Szőri Milán	MAKDKF3EN	Spring/Fall
	Application of Theoretical Chemistry Methods for Industrial Processes	Prof. Dr. Viskolcz Béla	MAKDKF4EN	Spring/Fall
	Data Analysis	Dr. Bánhidi Olivér	MAKDKF5EN	Spring/Fall

Annex 5.

RULES FOR RESEARCH SEMINARS
at the
ANTAL KERPELY DOCTORAL SCHOOL OF MATERIALS SCIENCE AND TECHNOLOGY

1. The Candidate proves his/her progress in his/her research topic with the Research Seminar. During the study at least seven public research seminar has to fulfil; three of them during the educational and research section, with maximum 15 credits/each and four more ones in the research and dissertation phase with 20 credits/each.

2. The formal requirements of the research reports submittet by the PhD student of the Doctoral School are the follows:
   a. Reports must be submitted in one copy in bound form to the Dean Office and one electronic copy (pdf) to that e-mail address which specified in the notification letter. Reports can only be accepted or submitted for review if they are signed by the supervisor(s).
   b. On the cover page of reports should be written the name of the Doctoral School, the number of the research seminar and the name of the PhD student, the supervisor(s) and also the institute.
   c. Reports must be writen in A/4 size with maximum 13 font size, 1.5 line spacing at least 20 and a maximum of 30 pages.
   d. Tables and figures shall be sequentially numbered and titled. To the report can be related references, annexes. The bibliography is recommended as follows:
   [Number] Author(s): Title, Place, Date, Page Number

3. The Head of the Doctoral School shall submit the written material of the research seminar to a lecturer or researcher who is familiar with the subject. The student receives the evaluation before the presentation. In order to follow the progress of the research topic, the PhD student's research seminar papers regularly review the same lecturer, if possible.

4. Successful completion shall be certified by the minutes of a common seminar organized at the following month after the end of educational period in each semester.

5. Research seminars are for the preparation to make the dissertation and form an appropriate thematic system. Members of the Doctoral Council should be invited to the research seminars.

6. Research seminars are organized by the Dean Office.

7. Evaluation of the research seminars:
   a. The research seminar report may only be submitted for presentation at the seminar if it has been evaluated by the reviewer for more than 60%. In case of a grade of 60% or less the report may only be presented at a next seminar after

consideration by the reviewer and correction, and for a newer grade of more than 60%.

b. The research seminars will be evaluated by the graduated members of the audience after the lecture and discussion. The head of the concerned topic field shall ensure that at least one professionally competent representative of the field is present at the research seminar in addition to the supervisor. If this condition is not met, the PhD student's research seminar cannot be evaluated. The audience will score 10 points during the seminar.
c. If the evaluation of both parties are over 60%, 15 credits in the 1-3 semesters and 20 credits in the 5-8 seminars can be achieved per semesters for completing the research seminar.
d. Complex exam and pre-defense replace the obligation of the research seminar in the given semester.

8. Methodology for the evaluation of research seminar papers:
   a. Must be at least 2500 characters long
   b. Consider to the relation of the report of the PhD student's research topic (0-10 points)
   c. Explain the structure of the report, its clarity and the comprehension of the used professional terms (0-10 points)
   d. Evaluate the level of professional literature: using of references, processing of the recent publications in restigious journals, presentation of professional relevant to the topic (0-20 points)
   e. Qualify the elaboration of the research topic: presentation of the experiments carried out (or taken from the literature), the professionalism and interpretation of the own diagrams, tables, images (0-30 points)
   f. Evaluate the summary of the report, the conclusions and future ideas (0-30 points)
   g. Include at least two questions to be answered by the PhD student at the research seminar.

   If the total score is above 95 points or below 60 points then justification must be provided. The % qualification is the points from the maximum abailable 100 points. The evaluation sheet is attached.

9. The research seminar may be supplemented twice during the entire training period on an additional research seminar.

Evaluation sheet

Antal Kerpely Doctoral School of Materials Science & Technology
for written research seminar work

Title and serial number of the research seminar

Author

Supervisor(s)

Reviewer

1. General evaluation that includes at least two questions to be answered by the PhD student at the research seminar		
(1000-2500 character)	Typed character:	0

2. The connection of the thesis to the PhD student's research topic (0-10 points)	Points:	
(250-500 character)	Typed character:	0

3. The structure, clarity of the thesis and the use and understandability clarity of professional terms (0-10 points)	Points:	
(250-500 character)	Typed character:	0

4. The quality of the literature overview: the professional use of references, the processing of fresh/new publications in prestigious journals, the presentation of the relevant professional content regarding to his/her research topic a (0-20 points)	Points:	
(500-1000 characters)	Typed character:	0

5. Development of the research topic: presentation of the experiments carried out (or from literature) , the professionalism of own drawings (or from the literature) , diagrams, tables and photographs (0-30 points)	Points:	
(500-1000 characters)	Typed character:	0

6. Overall impression, summary of the dissertation, its conclusions, and future ideas (0-30 points)	Points:	
(500-1000 character)	Typed character:	0

Total score (max. 100 points). According to the Regulations: "(7) Evaluation of research seminars: a) A research seminar paper may only be submitted for presentation at a seminar if it has been evaluated by the reviewer for more than 60%. At or below 60%, the dissertation will only be evaluated at the next seminar, after consideration and correction of the reviewer's suggestions for change, and another 60% can be given for presentation.		**0,0**
Please note: If the total score is above 95 points or below 60 points then justification is required (250-500 characters)	Typed character:	0

Date

Signature of the Reviewer