Graduate School of Advanced Mathematical Sciences

Department of Mathematical Modeling, Analysis and Simulation

Doctoral Program

[MIMS Ph. D. Program]

Application Guidelines (Summary)

(Type B : Pre-arrival Admission)

Enrollment for April 2011

MEIJI UNIVERSITY

● **Global COE (Centers of Excellence) Program:**

Graduate School of Advanced Mathematical Sciences, promoting 'Formation and Development of Mathematical Sciences Based on Modeling and Analysis'

The 21st century is the age of the mathematical sciences. The society that surrounds us is full of dynamically evolving systems, such as our brains, immune systems, the internet, economic changes and social developments. The evolution of life is just one example of how complex systems develop, overcoming uncertain fluctuations through self-organization and dynamic change. These systems can be observed everywhere, in our developing societies and in our changing natural environment, as well as in the biological domain. The complexities within these systems rest in the fact that they contain an extremely large number of elements, which are then contained within multiple layers that combine to make the whole system. The non-linearity hidden within these domains is gradually being revealed, and now that collecting large amounts of data has become possible, one of the most urgent challenges facing the mathematical sciences is to obtain a clearer understanding of these systems. In order to understand complex systems, we need to elucidate the multiple links that exist between all of the elements that make up a system, and we must innovate a new development of mathematical modeling and analysis by building models able to function at the core of investigations into these phenomena.

The Meiji Institute for Advanced Study of Mathematics (MIMS), - an affiliated research institute of the Organization for the Strategic Coordination of Research and Intellectual Property of Meiji University – as its foundation, Meiji University has been developing mathematical sciences as the methodology by focusing on complex phenomena found in society, in nature and in the biological world, to extract and comprehend the essences of these phenomena in order to bring up new proposal. Acknowledge these achievements, 'Formation and Development of Mathematical Sciences based on Modeling and Analysis' was selected for 2008 Global COE (Centers of Excellence) Program.

The graduate school has succeeded '**MIMS Ph.D. Program**' – an education and research activity of Global COE Program in which ultimately create an internationally renowned center for Mathematical Sciences based on modeling and analysis – also will expand dynamic educational research of cross-fields style to develop 'the mathematical sciences that give and contribute to our society'.

● **A vision for Human Resources Development within the Graduate School of Advanced Mathematical Sciences**

By elucidating complex systems appear in nature, society and biological world, together with

fulfilling social innovation by benefitting it to the society, we, the Graduate School of Advanced Mathematical Sciences is able to contribute improvement of humankind's welfare. Under this ideology, we intent to foster human resources who will acquire highly-sophisticated broad element of mathematical sciences, who will be able to work/research internationally, as an interface against various phenomena, with ability of bridging mathematics and sciences. At master's course, our aim is to educate students to become researchers or professionals who acquired conceptions and skills of mathematical sciences based on modeling and analysis which scheme is a fusion of mathematics and sciences. At doctoral course, in addition to cultivation of human resources from the master's course, we will guide those to be able to carry further research of theirs individually.

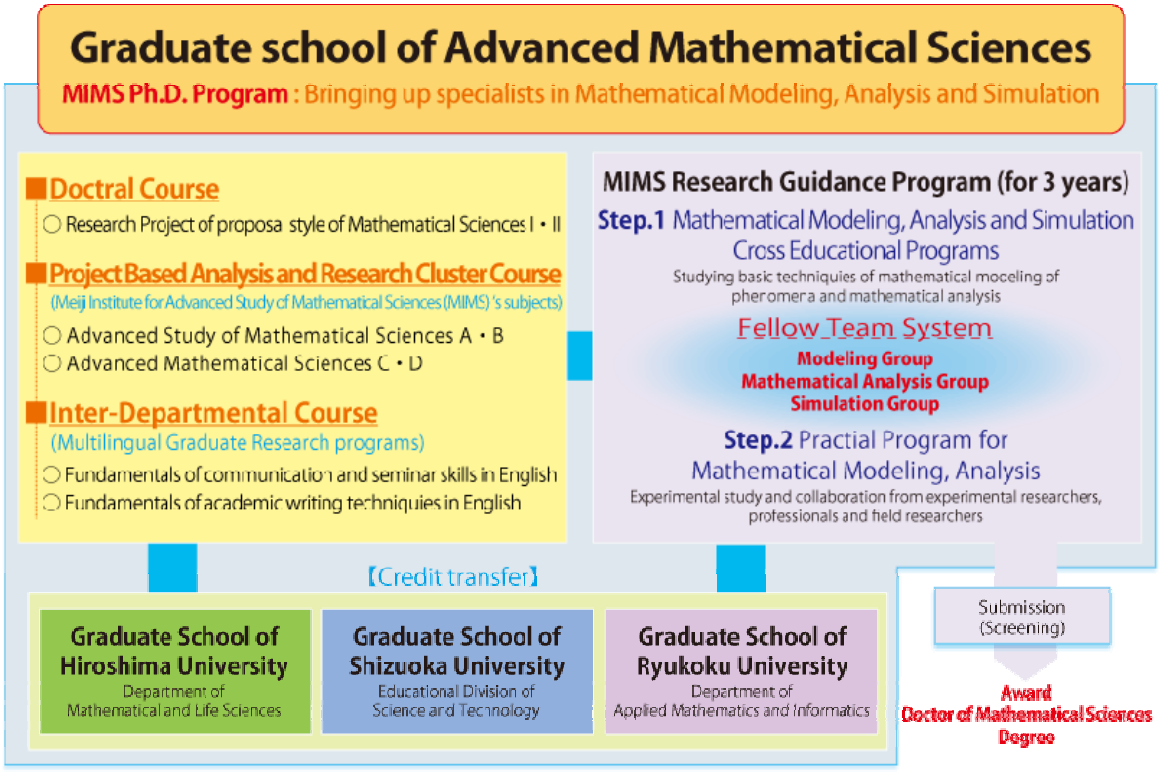
Therefore, at Mathematical Sciences Based on Modeling and Analysis, we offer educational research of mathematical sciences based on the construction of an extraction model to clarify the essences of phenomena. with the knowledge of highly sophisticated broad element of mathematics, we are eager to train young researchers to be able to contribute to our society extensively, with the bases of educational policy at Graduate School of Advanced Mathematical Sciences. Emphasis on education of mathematical sciences based on modeling and analysis, researching phenomena in nature, society and biological world from mathematical sciences' point of view, we organize curriculums with main structures of 'Modeling', 'Mathematical Analysis' and 'Simulation'. Moreover, by practicing combined, cross-fields type education of both natural science and cultural, social sciences, students are expected to cultivate the ability to clarify the phenomena in various fields, using mathematical sciences. Furthermore, in order to develop world's top level Mathematical Sciences Based on Modeling and Analysis, students will have opportunities to visit not only domestic but international institutions abroad as part of our exchange programs using credit transfer system so that they will have abilities to research/work internationally.

- **Outline of research and study guideline at the Department of Mathematical Modeling, Analysis and Simulation**

The education and research guidance at Graduate School of Mathematical Sciences will be further evolved based on the achievement of **MIMS Ph. D. Program**.

As Doctoral course's curriculum, 'Research Project of Proposal Style of Mathematical Sciences Ⅰ&Ⅱ' will be available in which students will chose research projects then plan and manage by themselves, and MIMS fellow will supervise them while supporting those researches. Moreover, 'Project Based Analysis and Research Cluster Course' and 'Inter-Departmental Course' at the Graduate School of Meiji University can be selected as optional subjects for this course. In the 'Project Based Analysis and Research Cluster Course', four subjects – ''Advanced Study of Mathematical Sciences A&B'', and ''Advanced Mathematical Sciences

C&D" – are provided, which are coordinated by MIMS fellows and research fellows. These advanced and specialized knowledge and technology will be taught in both English and Japanese together with the latest topics of mathematical sciences. 'The Inter-Departmental Course' offer a number of 'Multilingual Graduate Research Programs', such as ''Fundamentals of Communication and Seminar Skills in English'' and ''Fundamentals of Academic Writing Techniques in English''. These subjects, which are taught by English native speaking professors specializing in academic English teaching, are aimed to cultivate highly skilled researchers to be active internationally. Moreover, as an optional curriculum, students are encouraged to study at graduate schools of partner universities (Hiroshima University, Ryukoku University, Shizuoka University) where the credit transfer system and research guidance consignment agreements are available.



As to explain research guidance style, one of the supervisors who is in charge of Doctoral course as the main fellow, together with MIMS fellow or research fellow shall be selected from each MIMS research group (Modeling, Mathematical Analysis, and Simulation) to form a research guidance team which will then provide comprehensive supervision to each individual students depends on their researches. The examples of phenomena entitle for the research guidance are, life and biological phenomena, economical, financial and natural ones.

Students who have completed all the courses mentioned above and received a necessary

guidance, therefore achieved a certain level, will receive permission to submit a dissertation (Doctoral Thesis). Students who successfully pass the examination of the thesis will be awarded a Doctoral Degree.

● Multiple Guidance Structure by a Research Guidance Team

The focal point of the Graduate School of Advanced Mathematical Sciences is the research guidance provided to doctoral students. Providing students with consolidated instruction, appropriate to each individual research theme and consisting of a fusion of modeling (the mathematical description of phenomena), simulation (the analysis of phenomena) and mathematical analysis, is crucial for the effective study of mathematical modeling and analysis. The multiple guidance structure introduced for the MIMS Ph.D. Program is based on this very principle. Unlike the most of traditional model, in which one supervisor oversees the research of a number of students, MIMS fellows and research fellows will be selected according to the specific needs of each research project, and form a strong guidance teams consisting of three supervisors, with each fellow specializing in modeling, simulation and mathematical analysis respectively. This will allow students to learn the kind of mathematical modeling and analysis that will allow them to synergize mathematics and the sciences. Particularly outstanding is the fact that amongst MIMS fellows and research fellows there are many leading academics in the field of mathematical modeling and analysis, gathered not only from Meiji University but from other various institutions. Therefore students will come into contact with a wide scope of academic staff.

● **Model Research Themes**

Examples of research topics that would be supervised by Team Fellows are as below;

Research Themes	Modeling supervisor	Simulation supervisor	Mathematical supervisor
[Example 1] Theoretical Analysis of Cellular Information Processing Systems	Mathematical biology specialist with proven ability in biological phenomena modeling	Specialist in large-scale numerical modeling	Specialist in network geometric analysis
[Example 2] Analysis of the dynamics of share prices and the possibility of its accurate predictions	Specialist in financial engineering with strong history of collaborative research with finance professionals	Specialist in computer assistance/image enhancement analysis	Specialist in probabilistic logic/time series analysis
[Example 3] Spontaneous structural formations in nature	Specialist in the mathematic theories of self-organization	Specialist in model simulation analysis	Specialist in the Mathematical analysis of spontaneously occurring patterns in nature
[Example 4] Visual illusion phenomena and their applications to pattern recognition and pattern synthesis	Specialist in illusion sciences	Specialist simulation of geometric phenomena	Specialist in combinational analysis

Research themes related to mathematical modeling and analysis in addition to those mentioned above would be supported in the same way, by a team comprising of institute fellows and/or research fellows, all engaged at MIMS, which acts as the pillar organization for the Ph.D. program education.

For further details on Meiji Institute for Advanced Study of Mathematics (MIMS) and the Meiji University Global COE Program, please refer to the following websites:

http://www.mims.meiji.ac.jp/index-e.html (MIMS)

http://gcoe.mims.meiji.ac.jp/index-e.html (Meiji University Global COE Program)

1. Enrollment Quota, School and Program

Enrollment Quota	School, Department	Program
5	Graduate School of Advanced Mathematical Sciences Department of Mathematical Modeling, Analysis and Simulation	Doctoral Program

*Enrollment Quota of 5 is for combination of examination type A and B.

2. Examination type and Screening method

The following information applies to the examination type B (Pre-arrival admission for overseas residents) only.

For the information on the type A (Admission for residents in Japan), please refer to the Application Guidelines in Japanese or contact the Office of Graduate School of Advanced Mathematical Sciences.

(1) Examination type / Screening method

Examination type	Qualifications for application	Screening method
Type B Pre-arrival Admission	Those who research at universities or institutions abroad and are able to submit academic references.	Document Screening By Application Form, Research Plan, Recommendation Letters, Research Achievements etc.

(2) Application period / Examination Schedule

Examination type	Application Entry Term	Screening Fee Payment Term	Announcement of Result	Enrollment Registration Term
Type B Pre-arrival Admission	13th December 2010 to 15th December 2010	By 15th December 2010	4th February 2011	10th March 2011

Note: Applicants of Type B do not need to visit Meiji University for the screening.

3. Qualification for Application / Entry Requirements

Applicants should be or should have been engaged in research activities at universities or institutions abroad and are able to submit academic references. Furthermore, those must have foreign nationality and reside outside of Japan, also are applicable to one of the following categories.

(1) Those who have completed their primary and secondary education abroad, have graduated from foreign universities with a Bachelors' Degree (or equivalent), and have also obtained a Master's Degree or will be awarded the Degree by 31st March 2011.

(2) Those who have completed their primary and secondary education abroad, have graduated

from foreign universities with Bachelors' Degree, and have also obtained a Master's Degree or will be awarded it by 31st March 2011 as an international student of a Graduate School in Japan.

(3) Those who have completed correspondence course given by an institution abroad while residing in Japan and have obtained a Master's Degree or will be awarded the Degree by 31st March 2011.

(4) Those who are designated by the Japanese Ministry of Education, Culture, Sports, Science and Technology (Please refer to Note below).

(5) Those who have been approved through this Graduate School's individual qualification screening procedure as one whose academic credentials are equivalent to or superior to those who have a Master's Degree. Such applicants must be over age of 24 by 31st March 2011 (Please refer to Note below).

Note:

- Those who are applicable to category (4) or (5), are required to be verified for applications by the Office of Graduate School of Advanced Mathematical Sciences in advance as a regulation. Please send the following documents by 24th November 2010. We recommend you to submit the documents as early as possible.

You must NOT remit the screening fee before the Office of Graduate School of Advanced Mathematical Sciences forwards you the qualifications for application.

[The Documentation required for the qualifications for application]

a) 'Application form for Confirming the Qualifications for application (出願資格審査申請書)' (Prescribed format)

b) All other documents required for application.

- The definition of category (4) is as below :

  Those who had graduated from universities, and have been approved as having academic credentials equivalent to or superior to those who have Masters' Degree, through the experiences as researchers at any universities or institutions over 2years. Or, those who had completed a correspondence course given by institutions abroad for 16years while residing in Japan, and who have been approved as having academic credentials equivalent to or superior to those who have Masters' Degree, through their research results with the experiences as researchers at any universities or institutions over 2 years.

- **If you have any queries regarding the qualification for application, please contact the Office of the Graduate School of Advanced Mathematical Sciences.**

4. Application Procedure

(1) Application Documents

1) **Application Forms (Forms A, B and C)**
2) **3 Passport size color photographs of the applicant taken within 3 months before the application (4cm × 3cm).** All 3 photos should be identical.
3) **Official transcripts of <u>all</u> colleges, universities and graduate schools attended**
4) **Certificates of (expected) graduation from <u>all</u> universities and graduate schools attended**.
5) **Certificates of degree** (If applicable. Please refer to the Note below)
6) **Application Form for Admission of International Students to Meiji University** (prescribed form)
7) **Research plan** (prescribed form)
8) **Research achievements** (within THREE selected papers)
9) **TWO Recommendation letters** (prescribed form)
10) **Photocopy of passpor**t
11) **TOEFL Examinee Score Record or IELTS Test Report Form**
12) **Confirmation letter to apply for Meiji University Global COE Program Research Fellowships for Doctoral course students** (Prescribed form)
13) **Photocopy of Remittance Application for Remittance and Register of Remittance.**

(2) Screening Fee & Payment Method

The screening Fee for the Doctoral Course costs **<u>15,000 Japanese yen</u>** (non taxable)

5. Announcement of Examination Results

(1) The date of the announcement of examination results will be 4th February 2011.

(2) The applicants whose application is successful will receive the notice of result by post.

(3) To whom we offer places, we will send a formal offer of a place and acceptance form to the addresses written or printed on 'Application Form A' by post or courier services. Please note that it will NOT be given by hand at the Office of Graduate School of Advanced Mathematical Sciences.

6. Enrollment Registration

(1) Enrollment Registration

Date to send Enrollment Documents	Registration Period
4th February 2011	By 10th March 2011

(2) Enrollment Procedure

Please refer to 'Guidelines for Admission Procedure' enclosed with Enrollment Documents and complete the entrance procedure by the deadline mentioned above.

7. Financial Supports

(1) Global COE Program Research Fellowships for Doctoral course students:

Please note that the following fellowship is under review at the moment therefore subject to change.

In general, this fellowship is available to all applicants who had passed the entrance examination and have enrolled to the graduate school, except those who are offered the JSPS Research Fellowship and/or other fellowships.

Tenure	1year (from April 2011 to March 2012) *The contract will be renewable annually for a maximum of 3years.
Wages	200,000yen/month (*2,400,000yen/annual)
Note: The fellowship will be terminated at the point when the student is conferred a Doctoral Degree, or if the student is withdrawing from Meiji University before completing the 3year tenure. Further details are subject to each employment contract.	

(2) Scholarship System (Waiver of Tuition Fees)

All tuition fees, including entrance fee, annual tuition and lab experiments fees, will be waived as scholarship for all students who had passed the entrance examination and have enrolled the graduate school.

Note:

1. Meiji University Health Insurance Fee (2,500yen/annual) is not included in the financial support mentioned above. Therefore, it is payable by students themselves.

Tenure	During 3 year-Doctoral course *However student grant may be cancelled or stopped under those circumstances below: (1) Scholarship query review showed that one is not suitable as scholarship recipient. (2) If students take a leave or get expulsion from the graduate school.
Stipend	Tuition fees, including entrance fee, annual tuition and lab experiments fee.