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# Master Program for China-Russia Educational Cooperation
# Major in Power Engineering

**0858**

several high level scientific research projects are implemented jointly with National Natural Science Foundation, Natural Science Foundation of Jiangsu Province and the Ministry of National Defense of the People's Republic of China. With enough research fundings, all conditions were created to recruit the students for the program.

"Autonomous sources of power supply and electric transmission" which are working as a part of the center. A large amount of Master degree students takes part in various types of practical work on its basis. Teaching staff of the Chair regularly becomes participants and winners of the grants of Ministry of Education and Science of the Russian Federation, the Fund for the Promotion of Innovations and etc.

## Training Object

Students of this programme should grasp both solid theoretical foundation and systematic specialized knowledges in the sphere of power engineering, and obtain the ability on analyzing and solving problems independently. They should master both the basic technologies such as experiment tests, data analysis, computer programming, and develop the high innovative activity. In addition, the students should be familiar with international educational environment and have international communication skills. As a result, after graduation, they can be engaged in teaching, scientific research, design, production and management etc. in the field of power engineering under the international conditions, especially the initiative of the joint projects of building up the Silk Road Economic Belt and the 21st-century Maritime Silk Road.

Through this joint program both universities intend to achieve coordinated development in this academic field, contribute to its creation and train students with abilities and competencies which are appropriate for the international labour market and which meet the requirements for the Chinese-Russian social and economic cooperation process.

## Research Topic

| No. | Name of research direction | Brief introduction |
|---|---|---|
| 1 | The combustion and emission control for power machinery | Marine diesel engine before- and after-treatment |

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| | and equipment | technologies; Hazardous materials generation and control theories in internal combustion engine; New combustion system design; Low emissions engine technology |
| 2 | Vibration and noise control and fault diagnosis for power machinery | Low noise engine design technology; Vibration and noise control for marine main and auxiliary engines; Monitoring and fault diagnosis for marine power plant. |
| 3 | Strengthened heat and mass transfer and effective energy utilization technology | Mechanism of strengthened heat and mass transfer; New theories and methods of strengthened heat and mass transfer; Effective energy utilization in energy and power system. |
| 4 | Refrigeration, air conditioning and cryogenic engineering | Geothermal energy conversion and geothermal direct use; Cooling performance, air quality, thermal comfort and energy consumption for air conditioning system in new fuel ships. |
| 5 | New energy technology and application | Research on scientific and engineering application fields relating to the ship auxiliary new energy power system and marine wind energy applications |

## Teaching Language

English and Chinese

## Period and Credit

1. Period: 1+1+0.5

The standard period lasts 2.5 years, which can be prolonged for another half a year according to the relevant provisions.In the first year, students will have courses in China. In the second year, the students will transfer to Russia to continue their study of the second

stage, carry on subject research and complete their Russian dissertation. In the last one half year the students will work on the Chinese dissertation preparation and complete defense in China.

2. Credit

The EU credits and total EU credits of educational programmes are established by the partner universities according to the state requirements of each party. 60 credits are required for the program students in China, among which not less than 24 credits for degree courses, not less than 17 credits for elective courses and not less than 19 credits for practical trainings. To get the master degrees from both JUST and OMSU, the students have also to meet the degree awarding requirements including scientific research of the both universities. The students should successfully complete educational programme in full and pass State Final Examination to get the master degrees.

Each party approves the curriculum in accordance with the requirements of its country.

| The first year: at JUST | | | | | | | | |
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| **Course type** | | **Course name** | **Credithours** | **Credit** | **Semester** | **Language** | **Department** | **Remarks** |
| **Degree Course 24** | **General Course** | The socialism theory and practice with Chinese characteristic | 32 | 2 | Autumn | Chinese | JUST | Required course |
| | | First Foreign Language Russian | 128 | 4 | / Autumn/ Spring | Bilingual | JUST | |

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| | | Mathematical physics equations | 48 | 3 | Autumn | English | JUST | |
| | **Specialized Course** | Contemporary fluid and gas dynamics | 48 | 3 | Autumn | English | JUST | |
| | | Modern theory of heat transfer | 80 | 5 | Autumn | English | OMSU & JUST | |
| | **Specialized Core Course** | Calculation and design of autonomous energy sources | 64 | 4 | Spring | English | OMSU | |
| | | Calculation and design of automatic control systems for small energy facilities | 48 | 3 | Spring | English | OMSU | |
| **Non-Degree Course 17** | **Specialized elective course** | Application of fuel cells | 48 | 3 | Spring | English | JUST | 2 1 Select one |
| | | Renewable energy technology | 48 | 3 | Spring | English | JUST | |
| | | Instrumental survey of small energy facilities | 48 | 3 | Spring | English | OMSU | 2 1 Select one |
| | | Signal analysis and fault diagnosis | 48 | 3 | Spring | English | OMSU | |
| **Non-Degree Course 17** | **Specialized elective course** | Management of energy flows at cogeneration units | 48 | 3 | Spring | English | OMSU | 2 1 Select one |

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| | | Application of heat pump systems | 48 | 3 | Spring | English | OMSU | |
| | | Literature searching and scientific paper writing | 32 | 2 | Spring | English | OMSU | 2 1 Select one |
| | | Social adaptation and the basics of socio-legal knowledge | 32 | 2 | Spring | English | OMSU | |
| | | Calculation and design of heat transformers | 48 | 3 | Autumn | English | JUST | 2 1 Select one |
| | | Calculation and design of water recycling systems | 48 | 3 | Autumn | English | JUST | |
| | | Management of energy flows in marine power plants | 48 | 3 | Autumn | English | JUST | 2 1 Select one |
| | | Fundamental of digital design | 48 | 3 | Autumn | English | JUST | |
| | | Engineering ethics | 16 | 1 | Spring | Chinese | JUST | Required Elective |
| | | Introduction to dialectics of nature | 16 | 1 | Spring | Chinese | JUST | Required Elective |
| **Practical trainings 19** | | Academic practice | | 3 | Spring | English | OMSU & JUST | |
| | | Work experience practice | | 6 | Spring | English | OMSU & JUST | |

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| | | Research | | 10 | Autumn Spring | English | OMSU & JUST | |

| The second year: at OMSU |
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**Subject study and Research**

| The third year: at JUST | | |
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| **Content** | Dissertation and dissertation defense | Remark: Students succeeded in Chinese dissertation defense |

## Scientific research requires

JUST requirements

Before the defense, the program students should publish 2 papers in journal or in proceedings of national conference jointly with the supervisor (tutor as the first author). It could be a related invention patent disclosure.

OMSU requirements

Master's dissertation includes the use of new solutions (methods, dependencies, models, etc.) which are directly connected with approved topic. The novelty of the proposed solutions should be confirmed by the author in scientific articles (collections of articles, conference proceedings), patents for invention/utility model (at least two articles or patents should be performed during the whole period of study). A manuscript of review article, reflecting the problem of the dissertation topic not only in Russia and China, but also in the world, should be prepared at the end of the first year of study.

## Dissertation

The topic selection should be related to the field of Power engineering/Heat power engineering which has the actual engineering or the specific engineering background, and involves solution of particular technical tasks, novelty and workload directed on Master degree student. The dissertation should reflect the ability of Master degree students to use scientific theories, methods and techniques to solve practical problems, and have a certain theoretical basis, which is advanced and practical.

To apply for OMSU master degree, the dissertation should be written in English and made according to the standards of drawing up the documentation connected with academic activity. To apply for JUST master degree, the dissertation could be written in

English or Chinese. If the dissertation is written in English, the abstract should be translated into Chinese. If the dissertation is written in Chinese, the abstract should be translated into English.

## Degree Awarded

Students of this programme who have passed the examinations of the degC8144C02gC81

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