

# Doctoral Program in Power Engineering and Engineering

## Thermophysics

### 1. Introduction

Power Engineering and Engineering Thermophysics of Nanjing University of Science and Technology (NUST) is the first class discipline for doctoral degree, the key discipline of Jiangsu province, and also a key construction brand discipline of NUST. MIIT Key Laboratory of Thermal Control of Electronic Equipment, National Key Laboratory of Transient Physics and Nanjing Efficient Heat Transfer Engineering Technology Center are affiliated to this discipline.

### 2. Research Directions

- (1) Heat and mass transfer and its enhancement.
  - a. Understanding and characterizing micro/nano-scale heat and mass transfer.
  - b. Theory and technology for thermal management of electronic devices.
  - c. Understanding and tuning heat and mass transfer for extreme conditions.
  - d. Phase change heat transfer and its enhancement.
- (2) Target infrared radiation and radiative heat transfer.
  - a. Theory and technology for near/far-field thermal radiation.
  - b. Target infrared radiation simulations.
  - c. Measurements of material radiative properties.
  - d. Characterizing and tuning thermal radiation.
- (3) Clean combustion and pollutants control.
  - a. Advanced diagnosis theory and technology on combustion.
  - b. Combustion chemistry and kinetics.
  - c. Combustion reaction control.
  - d. Theory and technology of combustion pollutants control.
  - e. Combustion theory and technology of aero-engine.
  - f. Utilization of solid waste resources.
  - g. CO<sub>2</sub> capture and utilization of low carbon energy.
- (4) Detonation propulsion technology.
  - a. Continuous rotating detonation engine technology.
  - b. Continuous detonation turbine-combined engine technology.
  - c. Solid powder fuel detonation engine technology.
  - d. Integrated design technology of continuous detonation engine and aircraft.
- (5) Renewable energy technology.
  - a. Solar photovoltaics.
  - b. Hybrid solar photovoltaic/thermal technology.
  - c. Biomass energy conversion technology.
  - d. Reliability of wind turbines and its diagnosis.
  - e. Hydrogen energy and fuel cells.

### 3. Duration of studies

Full time PhD students are expected to complete their studies and earn their

degrees in 4 to 6 years, and they will be disqualified from the program after 6 years.

#### 4. Credits requirements

Students are required to complete at least 18 degree credits from courses in Section 5 with a minimum of 16 coursework credits and 2 obligatory courses.

#### 5. Curriculum

Course No.	Course Name	Semester	Credits
<b><i>I. Fundamental Courses</i></b>			<b>4</b>
L371A002	Chinese	Fall	2
L371A003	Introduction to Chinese Classics	Fall	2
<b><i>II. Core Courses</i></b>			<b>8+</b>
L113A010	Matrix Analysis and Computation	Spring	3
L113A008	Stochastic Mathematics	Spring	3
L113A006	Applied Partial Differential Equations	Spring	3
L113A007	Numerical Analysis	Spring	2
<b><i>III. Major Electives</i></b>			<b>4+</b>
S108B001	Advanced Engineering Thermodynamics	Fall	3
L108B003	Advanced Combustion Theory	Spring	3
S108B003	Advanced Heat Transfer	Fall	3
L108C009	Computational Heat Transfer	Spring	2
L108C011	Gas Turbine Combustion	Spring	2
L108C012	Low Carbon Utilization of Energy	Fall	2
L108C013	Evaluation Method of Energy System	Fall	2
L108C014	Micro- and Nano-manufacturing: Applications and Challenges	Spring	2
<b><i>IV. Thesis Credits</i></b>			
L0000003	Dissertation Proposal II	Fall	<b>2</b>
L0000004	Academic Activities II	Fall	
<b>Total Credits Required</b>			<b>18+</b>
NOTE:			
(1) PhD students are required to attend academic conferences for at least twice before defending their theses.			
(2) PhD students are required to present their research at the PhD Student Forum for at least twice before defending their theses.			
(3) PhD students are required to submit annual report on their research.			
(4) PhD students are usually expected to meet the course requirements in the first academic year, including: I. Fundamental Courses, II. Core Courses, and sufficient elective courses in III. Major Electives.			

#### 6. PhD Dissertation Topic and Research Proposal

PhD dissertation proposal should be no less than 10000 words long and has at least 80 references, 1/3 of which must be published in English and 1/3 of which must

be published in the recent 5 years. A PhD student should choose a research topic for the PhD dissertation and spend no less than 2 years on the dissertation research and writing, all under an advisor's guidance.

Detailed regulations and requirements on PhD dissertation are documented in the "*NJUST Regulations about the Topic Selection, Research Proposal and Composition of Postgraduate Theses and Dissertations*". The PhD dissertation research proposal writing and defense should be completed in no later than the second academic year of the program.

## **7. Publication**

To meet the degree requirements, a PhD student is required to have a certain number of academic publications related to the dissertation research. Detailed requirements are documented in "*NUST regulations on a postgraduate's publications of their research work*".

## **8. PhD Dissertation Requirements**

Detailed regulations and requirements on PhD dissertation are documented in the "*NJUST Regulations about the Topic Selection, Research Proposal and Composition of Postgraduate Theses and Dissertations*", and "*NUST Style Sheet for Theses and Dissertations*". For a joint effort with others, or a follow-up of previous work, the student should clearly specify his/her contribution to the thesis.