

力学专业(080100)博士留学生培养方案基本信息

General Information for PhD Students in Engineering Mechanics

一、学科专业简介/Brief Introduction of Discipline Area

上海交通大学力学学科建于1958年，于1963年开始招收硕士研究生，1982年开始招收博士生，是国内首批有权授予硕士和博士学位的学科，1995年设立博士后流动站，具有力学一级学科博士学位授予权。本学科教学和科研成果卓著，是国内著名的教学和研究单位之一，为一级学科国家重点学科。本学科设一般力学、固体力学、流体力学和工程力学四个二级学科和生物力学、海洋物理等交叉学科。现有中国工程院院士1人、教授20人、副教授15人。本学科建有"水动力学"教育部重点实验室(B类)和国家级力学实验教学示范中心以及一般力学在、固体力学、大型结构等专业实验室和海岸工程科学研究中心(合建)，是海洋工程国家重点实验室的主干学科之一。本学科拥有单、双轴加载MTS、激光全息、机-电耦合性能测试设备、风洞、重力式空泡水洞、波浪水槽、潮汐流水槽、结构动力和疲劳试验装置、晃荡试验装置、气浮试验台、激光动态测试等试验设备，并拥有大型高性能计算设备和MSC (Patran, Nastran, Dytran, Marc, Fatigue)、Abaqus、Ansys、Dads、Adams和Fluent等大型工程分析软件，为研究生提供优良的实验与计算条件。本学科注重力学的理论基础、工程应用和交叉学科的发展，紧密联系当前学科前沿和国民经济中的相关重大工程项目，涉及的领域包括船舶与海洋工程、航空和航天、土木、汽车、机械和其它交通运输等方面。本学科培养的研究生主要在国内外科研机构及高校从事科研教学工作和国内外行业重点企业从事研发工作，其中有很多人已成为国内外知名的学者和工程师。

The department of Engineering Mechanics was founded in 1958. The department consists of four second-class disciplines: general and fundamental mechanics, fluid mechanics, solid mechanics and engineering mechanics. The research areas are as following: high-speed hydrodynamics, flow noise and control, computational fluid dynamics, fatigue damage and computational mechanics, intelligent structure and compound material mechanics, multi-system dynamics and control, spacecraft attitude dynamics, non-linear dynamics, theory and application of vibration and vibration control, etc. The Department emphasizes on ability training of both fundamental theories and practical applications, and aims on cultivating high-level talents for fundamental researches, engineering technology and management in the related fields.

二、培养目标 / Academic Objective

硕士学位获得者应掌握数学、力学及有关的物理学理论基础及系统的专业知识。了解本学科的现状和发展方向。初步具有对复杂的研究对象正确建立力学-数学模型，并熟练运用各种分析方法、数值计算、实验方法以及编写程序进行研究的能力。较为熟练地掌握一门外语，能阅读本专业的外文资料并能撰写外文论文。

博士学科获得者应掌握坚实宽的基础理论和系统深入的专门知识。掌握两门以上外语，并能以其中一种熟练地阅读本专业的外文资料，并具有较为熟练的外文写作和会话能力。具有独立从事及组织重要科研工作的能力，能在力学理论、计算方法和科学技术上做出创造性成果。

This program aims at educating the future leaders for both academia and industry.

The obtainer of the Master degree's for the subject is expected to have a solid foundation in basic theory and systematic knowledge in engineering mechanics fields. The students will develop their analyzing, designing and experimental abilities.

The obtainer of the Ph.D degree for the subject is expected to be well-grounded in the theories concerned and profoundly informed of the history, orientations and the latest developments in this field. The students are expected to develop broad views in their specialty areas, creativity in science and engineering, and the courage to challenge technical barriers.

三、学习年限/Study Period

Four years.

四、课程学习要求/Curriculum and Credits

总学分16学分，GPA学分2分。

Students should acquire at least 16 credits, while at least 2 credits should be GPA courses. Generally courses should be finished within the first year.

五、学术论文/Academic Paper

本院博士学位留学生在读期间需以第一作者公开发表至少两篇国内外学术论文，其中至少一篇SCI论文。

The PhD students should publish at least two academic paper as the first author, including at least one SCI paper.

六、学位论文/Dissertation

- Topics requirements: The master students should determine their research topics and write research proposals based on the literature review, information collection and survey work under the guidance of their superiors after enrolment. The topics can be fundamental research, applied theoretical research or the development research of high-tech or key engineering technology.
- Format requirements: The format of the thesis should be in accordance with the requirements of Shanghai Jiao Tong University.
- Novelty Requirements: The thesis should be closely following the forefront of the subject with adequate novelty and produce creative research findings in both fundamental science and applied technology.

七、过程管理/Process

- 资格考试Qualification Examination: written and oral (Semester 3)
- 开题报告Thesis Proposal (Semester 4)
- 年度报告Mid-term Assessment/Annual Report for Thesis (Semester 6)

- 预答辩&答辩Preliminary Thesis Defence & Thesis Defence (Semester 8)

Course Information for PhD Students in Engineering Mechanics

课程性质	课程代码	课程名称 (中文)	课程名称 (英文)	学分	开课时间 (春/秋/夏)	是否计入平均绩点	授课语言	必修/选修
Course Module	Course Type	Course Title (Chinese)	Course Title (English)	Credit	Semester	GPA	Language	Compulsory/Optional
	CN16001	汉语	Chinese Language	2	Fall	No	English/Chinese	Compulsory
	FL28002	学术英语	English for Academic Purposes	2	Spring	Yes	English/Chinese	Compulsory
	G090510	中国文化概论	Introduction to Chinese Culture	2	Fall	No	English/Chinese	Compulsory
	GS00001	学术写作、规范与伦理	Scientific Writing, Integrity and ethics	1	Spring	No	English/Chinese	Compulsory
	F010518	计算流体力学	Computational Fluid Mechanics	2	Fall	No	English	Optional
	MA26074	计算方法	Numerical Analysis	3	Fall	Yes	English	Optional
	G071507	数学物理方程	Mathematical-Physical Equation	3	Fall	Yes	Chinese	Optional
	G071555	矩阵理论	Matrix Theory	3	Fall	Yes	Chinese	Optional
	G071560	小波与分形	Wavelet and Fractal	2	Spring	Yes	Chinese	Optional
	MA26070	偏微分方程数值方法	Numerical Solutions of Partial Differential Equations	3	Fall	Yes	English	Optional
	NA26011	物理海洋学	Physical Oceanography	3	Fall	Yes	Chinese	Optional
	NA26014	普通海洋学	General Oceanography	3	Fall	Yes	Chinese	Optional

	X010631	现代力学测量技术	Modern Mechanics Experimental Technology	4	Fall	Yes	Chinese	Optional
	X010638	连续介质力学导论	An Introduction of Continuum Mechanics	3	Fall	Yes	Chinese	Optional
	X100508	高等流体力学	Advanced Fluid Mechanics	3	Fall	Yes	Chinese	Optional
	X100510	流体力学中的现代数值方法（I）	Modern Numerical Methods in Fluid Dynamics(I)	2	Spring	Yes	Chinese	Optional
	X100511	流体力学中的现代数值方法（II）	Modern Numerical Methods in Fluid Dynamics(II)	2	Spring	Yes	Chinese	Optional
	X100519	多刚体系统动力学拉氏方法	Dynamics of Multi-rigid-body System with Lagrange Method	2	Fall	Yes	Chinese	Optional
	X100520	多刚体系统动力学笛卡尔方法	Dynamics of Multi-rigid-body System with Cartesian Method	2	Spring	Yes	Chinese	Optional
	X100526	计算固体力学	Computational Solid Mechanics	2.5	Spring	Yes	Chinese	Optional
	X100548	非线性动力学	Nonlinear Dynamics	3	Spring	Yes	Chinese	Optional
	C010721	计算材料与断裂	Computational Materials and Fracture	2	Fall	Yes	Chinese	Optional
	C071768	动力系统选讲	Selected Topics on Power System	3	Spring /Fall	Yes	Chinese	Optional
	C100701	非线性连续介质力学	Non-linear Continuum Mechanics	2	Fall	Yes	Chinese	Optional
	C100702	高等计算力学/有限元高等教程	Advanced Computational Mechanics/Advanced FEM Course	2	Spring	Yes	Chinese	Optional
	C100703	疲劳、损伤和结构寿命评估	Evaluation for Structure Fatigue, Damage and Life	2	Spring	Yes	Chinese	Optional
	C100707	湍流概论	Introduction of Turbulence	3	Fall	Yes	English	Optional
	C100709	自由表面水动力学	Free Surface Hydrodynamics	3	Fall	Yes	Chinese	Optional
	C100710	河口与环境流体力学	Estuary and Environmental Fluid Dynamics	3	Spring	Yes	English	Optional

C100712	水波动力学	Water Wave Dynamics	3	Fall	Yes	English	Optional
CV26003	计算结构力学	Computational Structural Mechanics	3	Spring	Yes	English	Optional
F100510	水动力学	Hydrodynamics	2.5	Fall	Yes	English	Optional
F100601	柔性多体系统动力学	Dynamics of Flexible Multi-body System	2	Fall	Yes	Chinese	Optional
NA26013	地球流体动力学	Geophysical Fluid Dynamics	3	Spring	Yes	Chinese	Optional
X010637	塑性力学	Theory of Plasticity	3	Fall	Yes	Chinese	Optional
X100509	流体力学中的数学物理方法	Methods of Mathematical Physics in Fluid Mechanics	3	Fall	Yes	Chinese	Optional
X100513	分析动力学	Analytical Dynamics	3	Fall	Yes	Chinese	Optional
X100523	断裂力学	Fracture Mechanics	2	Spring	Yes	English	Optional
X100524	材料力学行为	Mechanical Behavior of Materials	2.5	Spring	Yes	English	Optional
X100528	弹塑性力学	Elastici-Plastic Mechanics	3	Fall	Yes	English	Optional
X100531	变分原理与有限元方法	Variational Theory and Finite Element Method	3	Spring	Yes	English	Optional
B071701	科学计算 I (小波方法和辛几何算法)	Scientific Computation I (Wavelet Analysis and Symplectic Algorithm)	2	Spring	No	Chinese	Optional
B071703	应用泛函分析	Functional Analysis with Application	3	Spring	No	Chinese	Optional
B140703	第二外语 (日语)	Second Foreign Language (Japanese)	2	Fall	No	Other Language	Optional
B140704	第二外语 (德语)	Second Foreign Language (German)	2	Fall	No	Other Language	Optional
C100704	复合材料 II	Mechanics of Composite Materials II	2	Fall	No	Chinese	Optional
F100509	张量分析及应用	Tensor Analysis and Its Applications	2	Fall	No	Chinese	Optional

F100511	生物流体力学	Bio-fluid Mechanics	2	Fall	No	Chinese	Optional
F100516	数值模拟高性能计算方法	High Performance Computing in Numerical Simulations	2	Spring	No	Chinese	Optional
F100525	壳体理论与结构稳定性	Theory of Shell and Structure Stability	3	Spring	No	Chinese	Optional
F100532	复合材料力学	Mechanics of Composite Materials	3	Fall	No	Chinese	Optional
F100570	结构主动控制	Active Structural Control	2	Fall	No	Chinese	Optional
MA26069	非线性分析	Nonlinear Analysis	3	Spring	No	Chinese	Optional
NA26012	环境数据分析	Environmental Data Analysis	3	Spring	No	English	Optional
NA26015	海上实践	Ocean Field Trip	4	Spring	No	Chinese	Optional
X010507	河口海岸动力学	Estuary and Coastal Dynamics	2	Fall	No	English	Optional
X032504	线性系统理论	Linear System Theory	3	Fall	No	English	Optional
X100527	大型工程软件分析	Engineering Analysis Software	3	Fall	No	Chinese	Optional
X100539	结构动力学	Structural Dynamics	2	Spring	No	Chinese	Optional
S100502	学术报告会	Academic Reports	2	Spring	No	Chinese /English	Optional
NA26009	学术报告（海洋研究院）	Seminar (Institute of Oceanology)	2	Spring	No	Chinese /English	Optional

- Note: International students can select 1-2 English courses from other departments, under the advice of supervisors, and upon the approval the registration department. The credits associated with those courses can be counted as from specialized optional course module.