

Southwest Jiaotong University
Bridge and Tunnel Engineering

Program Objectives

The program aims to provide students with an opportunity to develop functional expertise, strategic perspectives that they require to operate effectively in a changing transportation environment or to understand such an environment; help students to learn both the successes and failures in China's bridge and tunnel engineering; introduce students the techniques of bridge and tunnel engineering to meet the needs of transportation modernization, as well as sharpen their leadership and communication skills.

Major

Bridge and Tunnel Engineering (Master/PhD)

Study Period

Master: Two years (course study for 1 year and thesis proposal for 1 year)

PhD: Four years (course study for 1 year and thesis proposal for 3 year)

Teaching Language

English

Curriculum

Course Level 课程层次	Course Type 课程类别	Course Code 课程代码	Course Name 课程名称	Focus 课程侧重	Credit Hours 学时	Credits 学分	Semester 学期			Assessment
							I	II	III	
Level 5 Intermediate Course	Public Course 公共课		基础汉语 I Basic Chinese I		32	2	√			
			中国文化 Chinese Culture		32	2	√			
			基础汉语 II Basic Chinese II		32	2		√		
			中国概况 China Overview		32	2		√		
			当代中国 Contemporary China		16	1		√		
	公共基础课 Common Basic Course	54012001	Numerical Analysis ※ 数值分析※	Theory	48	3	√			Examination
		54012002	Modern Mathematics and Physics Equations 现代数学物理方程	Theory	48	3	√			Examination
		54012003	Stochastic Processes & Time Series Analysis 随机过程与时间序列分析	Theory	48	3		√		Examination
			54012004	Applied Fuzzy Mathematics 应用模糊数	Theory	48	3		√	

		54012005	Mathematical Statistics& Multivariate Statistics ※ 数理统计与多元统计※	Theory	48	3	√		Examination
		54012006	Matrix Analysis ※ 矩阵分析※	Theory	48	3	√		Examination
		51212001	Elastic Mechanics※ 弹性力学※	Theory	48	3	√		Examination
		51212002	Plastic Mechanics 塑性力学	Theory	48	3		√	Examination
		51212003	Finite Element Method 有限元方法	Theory	48	3		√	Examination
		51232001	Vibration Theory& Application 振动理论及应用	Theory & Application	48	3	√		Examination
	专业基础课 Basic Professional Course	50113001	Structure Dynamics 结构动力学	Theory	48	3	√		Examination
		50113002	Computational Fluid Dynamics 计算流体力学	Theory	48	3		√	Examination
		50113003	Advanced Soil Mechanics 高等土力学	Theory	32	2	√		Examination
		50125002	Similarity Theory & Model Test 相似理论与模型试验	Application	32	2		√	Examination
	专业课 Professional Course	50124001	Construction Methods for Tunnel & Underground Works 隧道与地下工程施工方法	Application	32	2		√	Examination
		50124002	Tunnel Ventilation& Disaster Control 隧道通风与灾害控制	Application	32	2		√	Performance Review
		50124003	Disaster Prevention and Control and Security Technology in Railway and Highway Engineering	Application	32	2		√	Examination& Performance

			铁路公路工程灾害防治及安全 安全技术							Review /
		501240 04	Modern Construction and Security Technology 现代建筑施工与安全技术	Application	32	2	√			Examin ation
		501240 06	Composite Structure Bridge 组合结构桥梁	Application	32	2		√		Examin ation
		501240 07	Bridge Health Evaluation Theory & Method 桥梁健全性评估理论与方法	Application	32	2		√		Examin ation
		501240 08	Subgrade & Foundation Design Theory 地基及基础设计理论	Application	32	2	√			Examin ation
		501240 09	Design Theory of Deep Foundation Pit & Slope 深基坑及边坡设计理论	Theory & Application	32	2		√		Examin ation
		501240 10	Geotechnical Engineering Test Theories and Technology 岩土工程测试理论与技术	Application	32	2		√		Examin ation
		501340 01	Theories & Methods for Bridge Structure Analysis 桥梁结构分析理论与方法	Theory & Application	48	3		√		Examin ation
		501340 02	Steel Bridge Structure Theory 钢桥结构理论	Theory & Application	32	2		√		Examin ation
		501340 03	Elastic Thin-walled Beam Theory 弹性薄壁梁理论	Theory & Application	32	2		√		Examin ation
		501340 04	Tunnel Mechanics □ 隧道力学 * □	Theory	32	2	√			Examin ation

				& Application						
		501340 05	Shock Resistance and Absorption of Tunnels & Underground Structures□ 隧道与地下结构抗减震□	Theory & Application	32	2	√			Examin ation
		501340 06	Reliability of Tunnel & Underground Structure 隧道与地下结构可靠度	Theory & Application	32	2	√			Examin ation
		501340 07	Optimal Design for Municipal Pipe Network 市政管网优化设计	Theory & Application	32	2		√		Examin ation
		501340 08	City Flood ControlTheory and Its Application 城市防洪理论与应用	Theory & Application	32	2	√			Perform ance Review
		501340 09	Fluid Mechanics in Municipal Engineering 市政工程流体力学	Theory & Application	32	2		√		Examin ation
		501340 10	Disaster Prevention & Mitigation Engineering 防灾减灾工程学	Theory & Application	48	3		√		Examin ation& Perform ance Review /
		501340 11	Disaster Prevention Mechanism for Engineering Structures 工程结构防灾学原理	Theory & Application	32	2		√		Examin ation& Perform ance

										Review
		501340 12	Modern Architectural Structure Design Theory 现代建筑结构设计理论	Theory & Application	32	2		√		Examin ation
		501340 13	High Grade Concrete Structures 高等混凝土结构	Theory & Application	32	2		√		Examin ation
		501340 14	Geotechnical Engineering Design & Calculation Theory 岩土工程设计计算理论	Theory & Application	32	2	√			Examin ation
		501340 15	Seismic Resistance of Geotechnical Engineering Structures 岩土工程结构抗震	Theory & Application	32	2		√		Examin ation
		501340 16	Computer Graphics 计算机图形学	Theory & Application	32	2		√		Examin ation
		501340 17	Basic Properties of High Performance Concrete (HPC) 高性能混凝土基本性质	Theory & Application	32	2		√		Examin ation
		501340 18	Fundamental Theories for Concrete Durability 混凝土耐久性基本理论	Theory & Application	32	2		√		Examin ation

			501340 19	Structure Wind Resistance Design Principles 结构抗风设计原理	Theory & Application	32	2		√		Examin ation
			501340 27	Bridge Conceptual Design 桥梁概念设计	Theory & Application	32	2		√		Examin ation
			501340 28	Seismic and Wind Resistance of Bridge and Vehicle Resonance 桥梁抗风抗震与车振	Theory & Application	32	2		√		Examin ation
Level 6 Advanced Course	Common Basic Course 公共 基础课		640120 01	Applied Functional Analysis 应用泛函分析	Theory	48	3		√		Examin ation
	Basic Professional Course 专业基础课		601130 01	Advanced Rock Mechanics 高等岩石力学	Theory	32	2		√		Examin ation
	Professional Course 专业课		601240 01	Municipal Waste Treatment and Disposal Technology 城市垃圾处理与处置技术	Application	32	2		√		Examin ation
			601240 02	Engineering Structural Reliability and Its Application 工程结构可靠度及其应用	Application	32	2		√		Examin ation
			601340 01	Geotechnical Engineering Numerical Calculation 岩土工程数值计算	Theory & Application	32	2			√	Examin ation
			601340 02	Concrete Bridge Structure Theory 混凝土桥结构理论	Theory & Application	48	3		√		Examin ation
			601340 03	High-grade Composite Structure	Theory &	32	2			√	Perform ance

			高等组合结构	Application						Review
	601340 04	Multi-field Coupling Analysis in Tunnel & Underground Engineering 隧道与地下工程多场耦合分 析	Theory & Application	32	2		√			Perform ance Review
	601340 05	Design Methodology for Tunnel & Underground Engineering 隧道与地下工程设计方法	Theory & Application	32	2		√			Examin ation
	601340 06	Security Evaluation& Maintenance of Existing Tunnels 既有隧道安全性评估与维护	Theory & Application	32	2	√				Perform ance Review
	601340 07	Water Treatment Theory & Technology 水处理理论与技术	Theory & Application	48	3	√				Examin ation
	601340 08	Planning Theory and Application for Municipal Works 市政工程规划理论与应用	Theory & Application	32	2		√			Examin ation
	601340 09	Probability Concepts in Engineering Planning and Design 工程规划与设计中的概率概 念	Theory & Application	32	2	√				Examin ation & Perform ance Review /
	601340 10	Disaster Prevention and Mitigationfor Underground Works 地下工程减灾防灾学	Theory & Application	32	2		√			Examin ation & Perform ance Review /
	601340 11	High-grade Steel Structure 高等钢结构	Theory & Application	32	2		√			Examin ation
	601340 12	Principles of Structure Seismic Resistance& Isolation Design Principles 结构抗震与隔震设计原理	Theory & Application	32	2		√			Examin ation
	601340	Environmental	Theory	32	2	√				Examin

		13	Geotechnology 环境岩土工程学	& Application						ation	
		601340 14	Rock Blasting Control Theory 岩体爆破控制原理	Theory & Application	32	2		√		Examin ation	
		601340 15	Soil Dynamics 土动力学	Theory & Application	32	2		√		Examin ation	
Level 7 Frontier Course	Public Course 公共课		基础汉语 I Basic Chinese I		32	2	√				
			中国文化 Chinese Culture		32	2		√			
			基础汉语 II Basic Chinese II		32	2			√		
			中国概况 China Overview		32	2			√		
			当代中国 Contemporary China		16	1			√		
	Common Basic Course 公共基础课	740120 01	Modern Mathematics 现代数学	Theory	48	3			√		Examin ation
		740120 02	Reliability Mathematics 可靠性数学	Theory	48	3			√		Examin ation
		740320 01	Rough Set Model and Its Application 粗糙集模型及其应用	Theory & Application	32	2		√			Examin ation
	Professional Course 专业课	701340 01	Advanced Structure Science 高等结构学	Theory & Application	48	3		√			Perform ance Review
701340 02		Concrete Mechanics *(in English) 混凝土力学*(英文)	Theory	48	3		√			Perform ance Review	
701340 03		Earthquake Engineering 地震工程学	Theory & Application	48	3			√		Perform ance Review	
701340 04		Structural Wind Engineering 结构风工程	Theory & Application	48	3		√			Perform ance Review	

701340 05	Vehicle-Bridge Coupling Vibration 车桥耦合振动	Theory & Application	48	3		√			Perform ance Review	
701340 06	Underground Engineering Mechanics Principles *□ 地下工程力学原理*□	Theory & Application	32	2		√		Perform ance Review		
701340 07	Tunnel Dynamics *□ 隧道动力学*□	Theory & Application	32	2	√			Examin ation		
701340 08	Non-Continuum Medium Mechanics in Tunnel Engineering 隧道工程非连续介质力学	Theory & Application	32	2	√			Perform ance Review		
701340 09	Tunnel & Underground Engineering Informatization 隧道与地下工程信息化	Theory & Application	32	2		√		Examin ation		
701340 10	Shield Tunnel Design Theory 盾构隧道设计理论	Theory & Application	32	2		√		Perform ance Review		
701340 11	A Monograph of Municipal Engineering * (in English) 市政工程专论* (英文)	Theory & Application	32	2	√			Perform ance Review		
701340 12	Municipal Solid Waste(MSW) Management Theory & Its Application 城市固体废物管理理论与应用	Theory & Application	32	2	√			Perform ance Review		
701340 13	Methodology for Energy Conservation and Emission Reduction 节能减排与方法论	Theory & Application	48	3		√		Examin ation		
701340 14	Complexity of Geological Systems 地质系统复杂性	Theory & Application	32	2	√			Examin ation & Perform ance Review /		

			701340 15	Soil Mechanics for Unsaturated Soils (in English) 非饱和土土力学* (外文)	Theory & Application	32	2	√			Examination & Performance Review /
			701340 16	Mountain Science and Mountain Hazards Prevention and Mitigation 山地学与山地灾害防治	Theory & Application	32	2	√			Examination & Performance Review /
			701340 17	Modern Concrete Structure Science 现代混凝土结构学	Theory & Application	32	2		√		Performance Review
			701340 18	Deep Foundation Theory 深基础理论	Theory & Application	32	2	√			Examination
			701340 19	Geotechnical Engineering Reliability Principles 岩土工程可靠度原理	Theory & Application	32	2		√		Examination
			701340 20	Earthquake Geotechnics * (in English) 地震岩土工程学* (英文)	Theory & Application	32	2	√			Examination
			701340 21	Rock Blasting Mechanics 岩体爆炸力学	Theory & Application	32	2	√			Examination

Note: Level 5 is for Master program, Level 6 is for Master/PhD program, Level 7 is for PhD program.

Thesis

(1)Topic selection

Students are expected to select a topic which has important application value and theoretical significance to the construction of national economy, and it also should be combined with tutor's research projects as far as possible. The selected topic must be approved by mentor and through the arguments.

(2)Thesis proposal

Master students are required to complete the thesis proposal during the second semester; PhD Students are required to complete the thesis proposal during the second academic year. In the report meeting, students should solicit opinions widely, and the thesis proposal will be determined by the related discipline experts after the examination and approval. The contents and requirements of the thesis proposal consist of: dynamic and research level about thesis topic; the purpose and significance of the selected topic; the research contents and research methods; the results and level expected to achieve; thesis writing arrangements; qualifications for subject research and so on.

(3) Thesis writing program

Students are supposed to formulate a detailed thesis writing program under the guidance of tutor. In the program, there should be a detailed arrangements and instructions about research methods, experiments, funds and equipment, thesis writing deadline and the results expected to achieve.

(4) Thesis appraisal and defense and degree awarding should be executed according to relevant regulations of Southwest Jiaotong University.

Degree Requirements

Master: Students are required to successfully complete 26 credit-worth course work and a master thesis and thesis defense within the required time period. After meeting the above requirements and with the approval of Southwest Jiaotong University Degree Committee, the master degree will be awarded.

PhD: Students are required to successfully complete 17 credit-worth course work and a doctor thesis and thesis defense within the required time period. After meeting the above requirements and with the approval of Southwest Jiaotong University Degree Committee, the doctor degree will be awarded.