

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

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|-----|---|---|
| 1. | 课程名称 Course Title | 木构建筑——传统及更新 Timber Architecture: Tradition and Renewal |
| 2. | 授课院系 Originating Department | 社会科学中心 Center for Social Sciences |
| 3. | 课程编号 Course Code | SS150 |
| 4. | 课程学分 Credit Value | 2 |
| 5. | 课程类别 Course Type | 通识选修课程 General Education (GE) Elective Courses |
| 6. | 授课学期 Semester | 春季 Spring |
| 7. | 授课语言 Teaching Language | 中文 Chinese  |
| 8. | 授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation & Contact (For team teaching, please list all instructors) | 赵妍 ZHAO Yan 南方科技大学人文社会科学荣誉学会 Society of Fellows in the Liberal Arts, SUSTech zhaoy@mail.sustech.edu.cn |
| 9. | 实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact | 无 NA |
| 10. | 选课人数限额(可不填) Maximum Enrolment (Optional) | |

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|---|----------------|-----------------------|------------------------|-------------------------------------|--------------|
| 11. 授课方式 Delivery Method | 讲授 Lectures | 习题/辅导/讨论 Tutorials | 实验/实习 Lab/Practical | 其它(请具体注明) Other (Please specify) | 总学时 Total |
| | 32 | | | | 32 |
| 学时数 Credit Hours | | | | | |
| 12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements | 无 NA | | | | |
| 13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite | 无 NA | | | | |
| 14. 其它要求修读本课程的学系 Cross-listing Dept. | 无 NA | | | | |

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

通过对木构建筑发展历程及相关技术、自然与人文背景的讲述，使学生建立建筑文明发展史的总体认识，理解工业技术进步、自然地理气候变化、文化文明的发展对人类建造活动产生的必然影响。

通过对照我国与全球各地木构建筑发展历程的学习，学生们得以开拓视野；通过对木材、木构建筑构造节点与生产全过程工具的学习（手工业时代、工业化时代与数字时代），学生得以重新审视传统匠艺的精神内核，培养技术转移的产业意识；以井干式木构建筑为例，通过对重点发展成果及重点案例的深入解析，学生将掌握巧妙平衡传统表达与现代需求、高度整合传统匠艺与高新技术的设计策略。

借助木构建筑及其井干式建筑这一对象，学生可以辐射思考更广泛的传统继承及更新的议题。课程可为各领域的“乡情”转化培养具有全面视角与理性思考能力的潜力人才。

Through the lectures about the history of timber-construction buildings together with its related techniques and technologies, natural and humanistic backgrounds, students can establish a general understanding of the development history of architectural civilization; and understand the inevitable influences on human construction activities given by the development of industrial technology, natural geography and climate change, and the development of cultural and civilization.

Through the study of the development history of wooden construction around the world including China, students can broaden their horizons; through the study of timber, constructional joints and tools (handicraft era, industrialization era and digital era), students can re-exam the spiritual core of traditional craftsmanship and cultivate the industrial awareness of technology transfer; taking log construction as the example, through in-depth analysis of the key achievements and key cases, students will master the design strategies that are not only a subtle balance between traditional expressions and modern needs but also a high degree of integration of traditional craftsmanship and high-tech.

With the help of timber construction and log construction, students can extend their thinking on more issues of traditional inheritance and renewal. The course can cultivate potential talents with a comprehensive perspective and rational thinking ability in various fields of transforming "nostalgia".

16. 预达学习成果 Learning Outcomes

本课程预期让学生掌握以下技能和知识：

- 重新认识木结构建筑相关知识，修正普遍存在的谬误；
- 建立传统匠艺与进步科技并序发展的意识；
- 建立平衡自然条件与人文诉求的人类发展意识；
- 培养对广泛的传统内核及其更新策略的思辨能力。

Upon successful completion, students will be able to:

- Re-know timber construction buildings and correct common prejudice;
- Establish the awareness of both a craftsman and an engineer;
- Establish a consciousness of balances between natural conditions and cultural aspiration;
- Have critical thinking ability for the spiritual core of a broad range of traditions as well as their renewal strategies.

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人） Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)



第一部分：木构建筑概论

第一课：初识木构建筑（2学时）

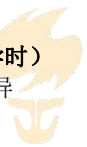
- ◆ 课程介绍
 - 课程背景：“双碳”与木构建筑
 - 课程背景：历史文脉与木构建筑
 - 课程背景：传统建筑更新设计的乱象
 - 课程安排与考核介绍
- ◆ 学生自我介绍
- ◆ 课堂简易木结构模型设计初探及制作练习（计入考核，需提前准备模型用材包括木条、木板、胶水、胶带、美工刀、打孔器、剪刀、拍摄背景板等）

第二课：世界木构建筑概览（2学时）

- ◆ 世界各地的传统木构建筑
 - 埃及 / 近东 / 希腊 / 罗马
 - 德语区
 - 北欧
 - 俄罗斯
 - 日本
- ◆ 现、当代木构建筑
- ◆ 学术分类及其产业背景
 - 井干式木构造体系
 - 早期木框架构造体系
 - 近代气球结构木构造体系
 - 平台框架木构造体系
 - 板式木构造体系
 - 现代木框架构造体系
 - 实体木构造体系
- ◆ 期中、期末作业具体布置与技巧讲解
 - 调研工具
 - 采访技巧
 - 建筑摄影技巧
 - 制图技巧
 - 图文排版技巧

第三课：中国传统木构建筑（2学时）

- ◆ 中国南北方木构建筑差异
 - “抬梁”与“穿斗”
- ◆ 北方官式建筑发展历程
 - 从土木结合到木构构架
 - 斗棋的建构逻辑
- ◆ 民间建筑与地区差异



SUSTech

Southern University
of Science and
Technology

第四课：作为建筑材料的木材（2学时）

- ◆ 木材的种类与特征
- ◆ 生态地理、材料与结构
 - 地理分区与建筑特征
 - 气候与材性
 - 案例：杉木之于中国、橡木之于欧洲、桧木之于日本
- ◆ 建筑、装修与家具用材
 - 材料差异、工艺差异、职业分工
- ◆ 改性木材

第五课：木构节点与木作工具（2学时）

- ◆ 节点类型与特点
 - 榫卯
 - 木质连接件
 - 金属连接件
- ◆ 手工业时代的木作工具种类与用法
- ◆ 文化差异与工具差异
 - 中国与欧洲木作工具的异同
 - 中国与日本木作工具的异同



- ◆ 工业革命后的木作工具与数字时代的木作工具

第六课：期中调研及辅导（2学时）

学生可利用该课堂进行调研，已完成调研的同学可就期中作业过程中遇到的问题向老师寻求一对一辅导

第七课：木构建筑工业调研报告——期中课堂汇报与点评（2学时）

学生分组调研广东木材市场或木构建筑加工制造工厂并完成期中报告：

木材市场调研部分内容包括木材市场区位、树种及来源、改性木材种类及来源、常见尺寸、价格、目标市场、配套产品等；木构建筑加工制造工厂调研部分内容包括工厂区位、规模、设备类型、制图软件、企业人员专业构成、产品类型、选材、材料处理、构造特点、“卖点”、运输方案、造价、售价、产值、目标市场等。建议借助影像、问卷与访谈等形式进行记录与分析，并最终以课堂陈述和图文报告的形式呈现（字数：2000-3000字）

第二部分：人类建造的共同本能——井干式建筑

第八课：重新认识“原始”的小木屋（2学时）

- ◆ 从“叠叠乐”谈起（课堂游戏，需提前准备叠叠乐）
- ◆ 林业资源与井干式建筑的世界版图
- ◆ 欧洲的传统井干式建筑
 - 中欧德语区
 - 北欧
 - 俄罗斯
- ◆ 美洲的传统井干式建筑
- ◆ 日本的传统井干式建筑
- ◆ 中国的传统井干式建筑
- ◆ 传统井干式建筑的“致命”缺陷

第九课：工业化与现代井干式建筑的发端（2学时）

- ◆ 建筑工业化与现代主义建筑的初期试水：首当其冲的德语区“小木屋”
- ◆ 格罗皮乌斯的井干式建筑工业化设计建造实践
- ◆ 瓦克斯曼的井干式建筑工业化设计建造实践

第十课：井干式建筑的技术（2学时）

- ◆ 经济性的需求——传统与更新
- ◆ 保温的需求——传统与更新
- ◆ 结构安全的保障——传统与更新
- ◆ 采光的需求——传统与更新
- ◆ 新技术要点总结
 - 胶合木梁技术
 - 预制化加工技术
 - 金属连接件



第十一课：“瑞士小木屋”的发展经验：过去与今天（2学时）

- ◆ 阿尔卑斯山腹地的小木屋传统
 - 地理及气候
 - 林业资源
 - 瑞士及中欧传统井干式建筑
- ◆ 瑞士现代建筑师的突出贡献
- ◆ 重点案例解析：彼得·卒姆托与卢齐住宅
 - 空间设计的突破
 - 建筑性能的提升路径
 - 传统的理性传承与表达
 - 依托预制建造技术的迭代实践：莱斯别墅组群

第十二课：吉翁·卡米纳达与瑞士弗林村井干式建筑文化的传承（2学时）

- ◆ 弗林村的井干式建筑传统与卡米纳达的“乡愁”
- ◆ 重点案例解析：弗林村枢室
 - 空间设计的突破
 - 建筑性能的提升路径
 - 传统的理性传承与表达
- ◆ 依托井干式建筑工业实现了人口回流和“乡村振兴”的弗林村

卡米纳达的工作成果总述及弗林村的发展现状

第十三课：美国当代井干式建筑木匠的实操经验（2学时）

- ◆ 井干式木屋建造全过程影像视频放映
- ◆ 影片中的知识要点分析与讨论

第十四课：中国的井干式建筑发展现状及机遇（2学时）

- ◆ 旅游业的刺激与井干式建筑的发展现状
- ◆ 工业技术调查
- ◆ 对照先进成果的自我剖析与发展展望
- ◆ 再思辨
匠人还是工程师？
死去的传统还是更新的传统？

第十五课与第十六课：木结构建筑案例解析——期末课堂汇报与点评（4学时）

学生以小组形式选取一个木构建筑作为案例进行解析并完成期末报告：

根据课堂所学，选择国内外一处具有代表性的木构建筑作为案例研究的对象，就其人文背景、工业背景、建筑师背景、工程师背景、木材特性、加工方式、建造方式、构造特点、空间类型、装饰特色、使用者情况、维护及更新情况等进行观察、解读与分析。建议借助影像、制图、模型、访谈等形式进行记录分析（模型需要的材料有木杆或木板、泡沫条或泡沫板、微缩植物模型、微缩人模型、卡纸等；工具有比例尺、美工刀、剪刀、手持泡沫切割器、胶水、胶带等），并最终以课堂陈述和图文报告的形式呈现（字数：2000-4000字）。

PART ONE: Overview of Timber Architecture

Lecture 1 Getting a Touch on Timber Architecture (2-credit hours)

- ◆ Course introduction
Course background: carbon peaking & carbon neutrality and wooden architecture
Course background: historical context and wooden architecture
Course background: design straying from the spiritual core of building tradition
Introduction of course arrangement and assessment
- ◆ Students introduce themselves
- ◆ A touch on architectural modelling with timber in class (it is included in the assessment. Materials and tools for modelling should be prepared in advance, including wooden strip, wooden board, glue, tape, knife, hole punch, scissors, background board, etc.)

Lesson 2: Overview of Worldwide Timber Architecture (2-credit hours)

- ◆ Historical wooden construction buildings around the world
Egypt/Near East/Greece/Rome
German-speaking region
The Nordic
Russia
Japan
- ◆ Modern and contemporary timber construction buildings
- ◆ Timber construction building systems in academic classification and industrial background
Log construction building system
Early timber-frame construction building system
Balloon-frame construction building system
Platform-frame construction building system
Modern frame construction building system
panel construction building system
Solid timber construction building system
- ◆ The detailed arrangement and skills introduction of the mid-term assignment and the final report
Research tools
Interview skills
Architectural photographing skills
graphical skills
Layout skills

Lesson 3: Historical Timber Architecture in China (2-credit hours)

- ◆ Wooden construction between the southern and northern China
“Tailiang” vs “chuandou”
- ◆ The development of the official construction in the North
From earth-timber construction to timber frame construction
- ◆ The structural logic of dougong



- ◆ Construction of the vernacular architecture and the features in different areas

Lesson 4: Wood as construction material (2-credit hours)

- ◆ Wood species and features.
- ◆ Ecogeography, material and structure
Geographical areas and architectural features
Climate and timber material
Case studies: "China-fir" in China, oak in Europe, cypress in Japan
- ◆ Timber in building and furnishing
Divisions in material, craftsmanship and occupation
- ◆ Modified wood

Lecture 5 Joints and Wood Working Tools (2-credit hours)

- ◆ Joint type and characters
mortise and tenon joint
wooden connector
metal connector
- ◆ Types and use of wood working tools in handicraft time
- ◆ Cultures and tools
Similarity and difference between China and Europe
Similarity and difference between China and Japan
- ◆ Types and use of wood working tools in industrialization time and digital time

Lesson 6: Investigation or Tutorial for the Mid-term Assignment (2-credit hours)

Students can use this tutorial period to conduct their investigation, and those who have completed the investigation can have one-on-one tutorial on the problems of the mid-term assignment.

Lesson 7: Investigation Report on Timber Construction Industry: Mid-term Class Presentation and Review (2-credit hours)

Students in groups need to investigate a wood market or a timber building manufacturing factory in Guangdong Province and to complete the midterm investigation report:

The investigation report of the wood market includes the location of the market, tree species and source, type and source of modified wood, common size, price, target market, relevant products, etc. The investigation report of the timber building manufacturing factories includes factory location, scale, equipment type, designing software, professional composition of the personnel, product type, material selection, material processing, construction characteristics, "selling point", transportation plan, cost, selling price, output value, target market, etc. It is suggested to record and analyze in the form of video, questionnaire and interview. The final version should be presented in class and in form of written report (2000-3000 words).

PART TWO: Instinctual Log Construction

Lesson 8: A New Understanding of the "Primitive" Cabin (2-credit hours)

- ◆ Start with "Jenga Jenga" (game in class)
- ◆ Forestry resources and the world map of log construction history
- ◆ Traditional log construction in Europe
German-speaking region of Central Europe
The Nordic
Russia
- ◆ Traditional log construction in America
- ◆ Traditional log construction in Japan
- ◆ Traditional log construction in China
- ◆ The "fatal" defect of traditional log construction building

Lesson 9: Industrialization and the Beginning of Modern Log Construction Building (2-credit hours)

- ◆ Building industrialization and the initial test of Modernist architecture: "Chalet" in German-speaking area
- ◆ Gropius
- ◆ Wachsmann

Lesson 10: Technology and Technique of Log Construction Building (2-credit hours)

- ◆ The need for economy -- tradition and renewal
- ◆ The need for insulation -- tradition and renewal
- ◆ The need for structural security -- tradition and renewal
- ◆ The need for daylighting -- tradition and renewal
- ◆ Summary of technology highlights
Laminated log beam
Prefabrication
Metal connector



Lesson 11: "Swiss Chalet" Development Experience: Past and Present (2-credit hours)

- ◆ A Log Cabin Tradition in Alps
Geography and Climate
Forestry resources
Swiss and central European traditional log construction
- ◆ The outstanding contribution by Swiss modern architects
- ◆ Peter Zumthor and Luzi House
A breakthrough in space design
Building performance improvement
Rational inheriting and expressing the building tradition
Iterative practice based on prefabrication: Leis Villas

Lesson 12: Gion Caminada and Vrin Village of Switzerland (2-credit hours)

- ◆ "Strickbau" tradition of Vrin Village and Caminada's "nostalgia"
- ◆ Key case: Stiva da Morts
A breakthrough in space design
Building performance improvement
Rational inheriting and expressing the building tradition
- ◆ Population growth and "rural revitalization" of Vrin based on log construction building industry
Caminada's work and the current state of Vrin

Lesson 13: Practical Experience of Contemporary Log Construction Carpenters in America (2-credit hours)

- ◆ Documentary film of the whole process of log construction building
- ◆ Analysis and discussion on the construction points of the documentary

Lesson 14: Status and Opportunities of Log Architecture in China (2-credit hours)

- ◆ The stimulation of tourism
- ◆ A survey on the industrial technology of log construction
- ◆ Self analysis and development prospect comparing with the advanced achievements of the world
- ◆ Rethinking
Craftsman or engineer?
Dead tradition or renewed tradition?

Lesson 15&16: Case Study Report: Final Class Presentation and Review (4-credit hours)

Students are grouped to conduct an case study report :

According to what you have learned in the courses, choose a representative timber building as the case to conduct a case study including its cultural background, industrial background, architect' background, engineer' background, wood characteristics, processing way, construction way, structural characteristics, space type, decoration characteristics, using situation, maintenance and renewal situation. The report can use images (photograph and video), diagrams, models (physical model and digital model) and audio/video interviews (modelling requires materials: wooden strips or boards, foam strips or boards, cardboard, miniature tree models, miniature human models, etc.; tools: scale bars, knives, scissors, hand-held foam cutters, glue, tape, etc.). The final version should be presented in class and in form of written report (2000-4000 words).

18. 教材及其它参考资料 Textbook and Supplementary Readings

本课程无固定教材，推荐采用以下参考资料：

图书 (Books)

中文 (含译著) :

- [英]威尔·普赖斯. 木构建筑的历史. 浙江人民美术出版社. 2016
- [中]朱涛. 梁思成与他的时代. 广西师范大学出版社. 2014
- [法]克洛德·列维-斯特劳斯. 野性的思维. 中国人民大学出版社. 2006
- [中]陈启仁. 认识现代木建筑. 天津大学出版社. 2005
- [中]赵广超. 不只中国木建筑. 生活·读书·新知三联书店. 2006

英文:

- Konrad Wachsmann. (1995). Building the Wooden House: Technique and Design / Konrad Wachsmann ; with Contributions of Michael Grüning and Christian Sumi ; Translation by Peter Reuss. Birkhäuser.
- Andrea Deplazes. (2010). Constructing Architecture: Materials, Processes, Structures: A Handbook. Basel; Boston; Berlin: Birkhäuser.

论文 (Papers)

- 赵妍. (2018). 吉翁·卡米纳达的井干式建筑设计方法研究——以弗林村枢室为例. 建筑学报, 10, 108–114.
- 赵妍. (2019). 现代井干式建筑体系设计方法——以彼得·卒姆托的卢奇住宅及莱斯别墅为例. 建筑学报, 11, 18–25.
- 赵妍, 孙宇璇, 何英杰, 孙昱杰, & 朱竞翔 (2017). 从现代趋向当代——预制装配式木构建筑与建筑系统发展相关问题讨论. 城市建筑, 5, 27–29.

博士论文 (Doctoral Thesis)

Zhao, Yan. "Modernizing Log Construction System : a Study on Technology Advancement and Design Strategy" ("井幹式建築體系的現代化研究：技術進步與設計策略") Chinese University of Hong Kong, 2021. Print.

课程评估 ASSESSMENT

| 19. 评估形式 Type of Assessment | 评估时间 Time | 占考试总成绩百分比 % of final score | 违纪处罚 Penalty | 备注 Notes |
|--------------------------------|--------------|--|-----------------|---|
| 出勤 Attendance | | 5% | | 无故缺席 5 次及以上为不通过 Students with absence of 5 times or more will be noted as "not passed" |
| 课堂表现 Class Performance | | 10% | | 参与课堂问题讨论与模型制作 Participation in class discussion and modeling |
| 小测验 Quiz | | | | |
| 课程项目 Projects | | | | |
| 平时作业 Assignments | | | | |
| 期中考试 Mid-Term Test | | 35% (课堂汇报 15%+报告 20%) (presentation 15%+report 20%) | | 学生分组调研广东木材市场和木构建筑加工制造工厂并完成期中报告： 木材市场调研部分内容包括木材市场区位、树种及来源、改性木材种类及来源、常见尺寸、价格、目标市场、配套产品等；木构建筑加工制造工厂调研部分内容包括工厂区位、规模、设备类型、制图软件、企业人员专业构成、产品类型、选材、材料处理、构造特点、“卖点”、运输方案、造价、售价、产值、目标市场等。建议借助影像、问卷与访谈等形式进行记录与分析，并最终以课堂陈述和图文报告的形式呈现（2000-3000 字） Students in groups need to investigate the wood market and timber building manufacturing factories in Guangdong Province and to complete the midterm investigation report: The investigation report of the wood market includes the location of the market, tree species and source, type and source of modified wood, common size, price, target market, relevant products, etc. The investigation report of the timber building manufacturing factories includes factory location, scale, equipment type, designing software, professional composition of the personnel, product type, material selection, material processing, construction characteristics, "selling point", transportation plan, cost, selling price, output value, target market, etc. It is suggested to record and analyze in the form of video, questionnaire and interview. The final version should be presented in class and in form of written report (2000-3000 words). |

期末考试
Final Exam
期末报告
Final
Presentation

| | | | |
|---|--|--|--|
| | | | |
| | 50% (课堂汇报 20%+报告 30%) (presentation 20%+report 30%) | | <p>学生以小组形式选取一个木构建筑作为案例进行解析： 根据课堂所学，选择国内外一处具有代表性的木构建筑作为案例研究的对象，就其人文背景、工业背景、建筑师背景、工程师背景、木材特性、加工方式、建造方式、构造特点、空间类型、装饰特色、使用者情况、维护及更新情况等进行观察、解读与分析。建议借助影像、制图、模型、访谈等形式进行分析记录，并最终以课堂陈述和图文报告的形式呈现（2000-4000字）。</p> <p>Students are grouped to conduct an case study report :</p> <p>According to what you have learned in the courses, choose a representative timber building as the case to conduct a case study including its cultural background, industrial background, architect' background, engineer' background, wood characteristics, processing way, construction way, structural characteristics, space type, decoration characteristics, using situation, maintenance and renewal situation. The report can use images (photograph and video), diagrams, models (physical model and digital model) and audio/video interviews. The final version should be presented in class and in form of written report (2000-4000 words).</p> |
| 其它（可根据需要改写以上评估方式）Others (The above may be modified as necessary) | | | |

20. 记分方式 GRADING SYSTEM

- A. 十三级等级制 Letter Grading
 B. 二级记分制（通过/不通过） Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority