

Appendix C-6: Graduation Comprehensive Training Task
Book



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※ ※ ※ ※ ※ ※ ※ ※ ※
※ The Class of 2025 ※
※ Graduation Project ※
※ Materials (Part 1) ※
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湖南城市学院

Graduation Project Assignment Document

Project Title	**** Teaching Building Construction Drawing Design
Name	_____
Student ID	_____
School/Department	School of Civil Engineering
Major/Specialization	Civil Engineering (Architectural Engineering Specialization)
Supervisor/Advisor	_____

December 20, 2024



I. Teaching Objectives of the Graduation Project

The graduation project is a comprehensive teaching component conducted after the completion of theoretical instruction and related practical training as per the academic plan. It represents the final phase and overall quality assessment of a student's on-campus learning, serving as a continuation and expansion of their specialized direction. Through this teaching component, students are cultivated to integrate theory with practice and to work independently. It comprehensively evaluates their ability to grasp and apply fundamental theories, knowledge, and skills, as well as their capacity to analyze and solve practical problems. This process provides students with systematic and comprehensive training in the entire process of single-project construction, from proposal development to the effective expression of design drawings.

II. Main Content of the Graduation Project

For this graduation project, students are required to complete a BIM model of a building based on the specific requirements of the selected topic, and to finalize its architectural and structural design. This includes producing a complete set of architectural and structural construction drawings, manually calculating a representative frame, and hand-drawing its reinforcement details. The specific requirements are as follows:

1. Architectural Proposal. Based on the design requirements, and considering factors such as the building's functional use, the combination of plan and space, traffic organization, fire evacuation distances, and seismic requirements, determine the architectural design scheme.

2. Manual Structural Calculation. Based on the design data, determine the structural calculation diagram of the calculation unit. Calculate permanent loads, live loads, wind loads, and horizontal seismic effects. Determine the internal forces under these loads, combine and adjust the internal forces, and perform section design based on the most critical internal forces.

3. Structural Computer-Aided Calculation. Use industry-related software such as YJK or PKPM to perform structural calculations and adjust key parameters. This includes inputting overall information, creating a 3D model, reviewing data, and generating calculation reports.



4. Construction Drawings. This includes a complete set of architectural construction drawings, structural construction drawings, and hand-drawn reinforcement details of a representative frame based on manual calculation results.

(1) The architectural construction drawings include: a table of contents, site plan, general architectural design notes, door and window schedule, finishing schedule, floor plans, roof plan, elevations, sections, and details (if applicable).

(2) The structural construction drawings include: a table of contents, general structural design notes, foundation plan and details, column reinforcement drawings for each floor, beam reinforcement drawings for each floor, slab reinforcement drawings for each floor, stair reinforcement drawings, and details (if applicable).

5. BIM Model. Use BIM software such as Revit to construct a comprehensive building information model.

6. Graduation Project General Description. Through the complete graduation design process, students should be able to articulate design intentions, conduct scheme comparisons, and consider constraints such as social, health, safety, legal, cultural, and environmental factors in their design proposals. They should evaluate the impact of the design on society, health, safety, law, and culture, as well as assess the influence of the designed project on environmental and sustainable development in engineering practice.

III. Project Title and Design Materials

(1) **Project Title:** *** Teaching Building Construction Drawing Design

(2) **Design Materials:**

1. Construction Site: ****

2. Building Scale and Structural Form

Approved total building area: approximately 7,600 m²; number of floors: 3-4 stories.

3. Building Area Allocation Standards and Requirements

(1) Room Names and Standards:

	Room Names	Number of Rooms	Notes



Teaching Facilities	Regular Classrooms	30	<p>Each class accommodates 50 students.</p> <p>Language classrooms include an additional control room.</p> <p>Art classrooms include an additional teaching aids room.</p>
	Laboratories	6	
	Instrument Preparation Rooms	6	
	Music Classrooms	2	
	Musical Instrument Rooms	2	
	Language Classrooms	2	
	Computer Classrooms	2~4	
	Art	2	
	Faculty Lounges	4~5	
Administrative Facilities	Teaching Offices	15	<p>Reception and duty rooms may be located outside the building.</p>
	Party and Administrative	8	
	Club Offices	2~3	
	Reception and Duty Rooms	2	
Living and Auxiliary Facilities	Faculty Dormitories		<p>Dormitories and cafeterias are to be arranged in the site plan.</p>
	Faculty Cafeterias		
	Restrooms		

(2) Site Plan Layout



The site plan should include at least the following:① Teaching Building.② Sports Field: One 250-meter circular track (with a 100-meter straight track), two basketball courts, two volleyball courts, and one badminton court.③ Pathways and landscaping.

4. Architectural Technical Conditions

(1) Meteorological Conditions: Directly query local meteorological data.

(2) Engineering Geological Conditions:① Class III site. Within 1 meter of the natural surface is fill soil, below which is a 3-meter-thick layer of sandy clay, followed by a gravel layer. The characteristic bearing capacity of the sandy clay foundation is [value], and that of the gravel layer is [value].② Groundwater level: 2.0 meters below the surface, non-corrosive.③ The adjacent existing building has a strip foundation, with its bottom elevation 1.2 meters below the outdoor ground level. There is a drainage culvert under the road at a depth of 3.0 meters.④ The seismic intensity of the building is 7 degrees, with a design basic seismic acceleration value of 0.15g.

(3) Material Supply:① The three main materials (steel, cement, and wood) are supplied by building material companies, with a complete range of varieties.② Wall materials can be selected from sintered hollow bricks, aerated concrete blocks, etc.

IV. Basic Requirements for the Graduation Project

1. Architectural Proposal: ① The design proposal must comply with relevant professional standards and meet the following requirements:《民用建筑设计统一标准》GB 50352-2005、《房屋建筑制图统一标准》GB/T 50001-2017、《建筑设计防火规范》GB 50016-2014、《建筑抗震设计规范》GB 50011-2010、Architectural construction atlases, as well as design codes for buildings with different functional uses, such as:《旅馆建筑设计规范》JGJ 62-2014、《办公建筑设计规范》JGJ 67-2006、《中小学校设计规范》GB 50099-2011、《图书馆建筑设计规范》JGJ 38-2015,etc., and comply with relevant policies, laws, and regulations. ② Write the first part of the graduation project general description, elaborating on the design intent. Compare and select at least three preliminary architectural schemes, analyzing the advantages and disadvantages of the proposed design. The design should consider constraints such as social, health, safety, legal, cultural, and environmental factors. Evaluate the impact of the design on society, health, safety, law, and culture. Be able



to analyze the effectiveness and limitations of the design and explain the impact of engineering practices on the local environment and sustainable development.

2. Manual Structural Calculation: ① The calculation of structures or components should comply with: 《建筑结构荷载规范》GB 50009-2012, 《混凝土结构设计规范》GB 50010-2010, 《钢结构设计标准》GB 50017-2017, 《建筑工程抗震设防分类标准》GB 50223-2008, 《建筑抗震设计规范》GB 50011-2010, 《高层建筑混凝土结构技术规程》JGJ3-2010 and other industry standards and regulations. The manual calculation report should be bound into a booklet, with the calculation process neatly written, logically clear, and the drawings accurately prepared, meeting the graduation design requirements of Hunan City University. ② The manual calculation report should include at least the comparison and determination of material selection, structural calculation methods, section design choices, etc.

3. Structural Computer-Aided Calculation: Familiarize yourself with structural and component modeling methods and analysis. Understand the parameter settings and code provisions in the software, as well as the exported computer-aided calculation data, graphics, and other results. Compile the relevant computer-aided calculation report.

4. Construction Drawings: Includes architectural construction drawings, structural construction drawings, and reinforcement drawings for one frame template. The design depth of the construction drawings shall comply with the construction drawing design standards specified in the 《建筑工程设计文件编制深度规定》（2022年版）.

5. BIM Model: Use BIM software such as Revit to construct the building information model for the proposed design.

6. Graduation Project General Description: Building on the first part of the aforementioned graduation project general description, continue writing the second part, including: ① Insights and experiences gained during the design process. ② A summary and evaluation of the impact of engineering practices related to complex civil engineering problems on the environment and sustainable development. ③ The total word count should be no less than 5,000 words, with a repetition rate not exceeding 25% and a citation rate no lower than 0.



V. Schedule Arrangement

Serial Number	Content of Each Stage of the Graduation Project	Start and End Dates
1	Architectural Design: BIM Model, Architectural Construction Drawings, Graduation Project General Description (Part 1)	Weeks 1-4
2	Manual Structural Calculation: Manual calculation of one frame and drawing its detailed diagrams.	Weeks 5-8
3	Structural Computer-Aided Calculation: Computer-aided calculation report and structural construction drawings.	Weeks 9-11
4	Graduation Project General Description (Part 2).	Weeks 12
5	Results Evaluation, Organizing and Archiving Design Results, Defense.	Weeks 13-14

VI. Main References

- [1] GB 50352-2023. 民用建筑设计通则[S]. 中国建筑工业出版社, 2023.
- [1] GB/T 50001-2017. 房屋建筑制图统一标准[S]. 中国建筑工业出版社, 2017.
- [2] GB 50016-2023. 建筑设计防火规范[S]. 中国计划出版社, 2023.
- [3] GB 50011-2010. 建筑抗震设计规范[S]. 中国建筑工业出版社, 2010.
- [4] GB 50099-2011. 中小学校设计规范[S]. 中国建筑工业出版社, 2011.
- [5] GB 50009-2012. 建筑结构荷载规范[S]. 中国建筑工业出版社, 2012.
- [6] GB 50010-2010. 混凝土结构设计规范[S]. 中国建筑工业出版社, 2010.
- [7] GB 50223-2022. 建筑工程抗震设防分类标准[S]. 中国建筑工业出版社, 2022.
- [8] JGJ 3-2010. 高层建筑混凝土结构技术规程[S]. 中国建筑工业出版社, 2010.
- [9] 沈蒲生, 梁兴文. 混凝土结构设计原理[M]. 高等教育出版社, 2020.
- [10] 刘静, 王刚, 徐立丹, 等. BIM 技术施工应用[M]. 西南交通大学出版社, 2023.