

## Appendix Record D-8: Introduction to Major Laboratories

The school teaching laboratories are divided into basic laboratories and specialized laboratories, implementing a two-level management system of school and college. The basic laboratories undertake the basic experimental teaching tasks of this major, while the specialized laboratories undertake the specialized basic experiments and specialized experimental teaching tasks. The opening rate of required experimental projects for all courses in this major is 100%, and the number of instrument equipment sets can meet the experimental requirements of students, and they can be updated in a timely manner, fully meeting the needs of this major's experimental teaching and students' extracurricular scientific innovation and practical activities. A sound equipment management system has been established to ensure the safety and good operation of experimental teaching.

(1) The experimental site and the quantity and functions of the experimental equipment meet the teaching needs of this major.

### 1) Basic Laboratory

**Basic Chemistry Laboratory:** Established in April 1998, the laboratory currently covers an area of over 5,000 square meters, with a total equipment value of approximately 22 million yuan. The experimental courses offered include: inorganic and general chemistry experiments, organic chemistry experiments, physical chemistry experiments, and more. This laboratory also offers nearly 120 innovative research experimental projects for college students, open experimental projects, and teacher research projects, receiving an average of over 1,600 students annually.

**Basic Physics Laboratory:** Established in 1998, the Basic Physics Laboratory is responsible for the physics experiment courses for nearly 5000 students, totaling 300,000 person-hours of teaching. Currently, there are 21 experimental projects, with a 100% experiment offering rate. The physics laboratory has a total area of 2400m<sup>2</sup>, including 24 laboratories, with a total value of instruments and equipment close to 7 million yuan.

**Computer Training Center:** Established in 2017, the Computer Training Center currently has 9 computer training labs, 1 BIM center, with a training area of about 1200 square meters, and has more than 1000 computers, which can simultaneously accommodate over 1000 people to conduct computer-related course training and teaching work. The main areas include practical teaching in basic computer operations, fundamental computer knowledge, Windows operating system, Office software, computer maintenance, computer security, and programming languages. There are 22 full-time and part-time teachers, and each year, student training reaches over 250,000 person-times.

**Electrical and Electronic Training Base:** Established in 2017, the training room currently covers an area of 600 square meters, and the training base mainly undertakes electrical and electronic training for students in science and engineering majors across the school. It can conduct identification and testing of electronic components, use of

common tools and measuring instruments, training in manual soldering methods, assembly of electronic products, simple manual soldering of STM components, basic electrical training, power drive training, lighting circuit training, and other training projects. The total value of the instruments and equipment at the training base is 2.7 million yuan, with the main instruments and equipment including: 48 RG-DZ-II electronic technology comprehensive innovation experiment platforms, 98 DS1104Z digital storage oscilloscopes, 98 DG4102 multi-channel arbitrary waveform signal generators, 98 DPS6333L programmable DC power supplies, 50 DM3058E desktop multimeters, 98 sets of component identification experimental systems, 4 transistor graphic testers, 8 computers, and 17 sets of SL-110 integrated electrical skills workstations.

**Metalworking Training Room:** Established on September 1, 2017, it includes traditional processing training and modern processing training. The training area covers approximately 2,000 square meters and has nearly 140 training equipment (sets) with a total value of 4 million yuan. The main equipment includes 16 ordinary lathes, 4 horizontal milling machines, 1 surface grinder, 8 welding machines, 4 industrial drills, 2 saws, 2 grinding machines, 16 sandboxes, 8 CNC lathes, 2 CNC milling machines, and 2 CNC electrical discharge wire cutting machines. Currently, there are 11 instructors, including 1 training room director, 9 metalworking manufacturing technology instructors, and 1 maintenance technician. The Metalworking Training Room focuses on cultivating applied talents, emphasizes problem-oriented and goal-oriented approaches, and solidly promotes the structural reform of the education supply side in the school. It offers metalworking training courses to over 2,500 students in science and engineering majors across the school.

**Surveying and Municipal Experiment Training Center:** Equipped with advanced experimental equipment and excellent practical teaching conditions, it has water drainage engineering laboratory, building environment and equipment engineering laboratory, surveying practical teaching center, etc. 3 professional laboratories, with a total of 28 experimental rooms, an actual usage area of 3185.06 square meters, and more than 1000 sets of experimental equipment, with a total value of over 11 million yuan. Relying on Hunan Province ordinary colleges and universities "13th Five-Year Plan" professional comprehensive reform pilot project—water supply science and engineering, Hunan Province university-industry-research cooperation demonstration base—key technology integration for urban safety water supply, provincial surveying engineering virtual simulation experimental teaching center, Hunan Province ordinary colleges and universities practical teaching demonstration center, and national civil engineering experimental teaching center municipal measurement sub-center and other 4 teaching and research platforms, fully meeting the basic, innovative, and comprehensive design experimental needs of various professional courses in the School of Municipal and Surveying Engineering.

The basic laboratory conditions related to the experimental teaching of professional courses are shown in Table D-8-1 as indicated.

**Table D-8-1 Undergraduate Teaching Basic Summary Table of Basic Laboratory Conditions**

<b>Laboratory name</b>	<b>Area</b>	<b>Open method</b>	<b>Types of equipment</b>	<b>Part-time</b>	<b>Main use</b>

	(m <sup>2</sup> )	and utilization rate	t and quantity	mana geme nt perso nnel	
Basic Chemistry Laboratory	1960	Undergraduate teaching + open laboratory / 100%	129 types / 526 sets	15	"General Chemistry," "Organic Chemistry," "Physical Chemistry" laboratory experimentsand offer college students innovation activities.
Basic Physics Laboratory	2400	Undergraduate teaching + open laboratory / 100%	335 types/241 0 sets	10	"University Physics Experiment"and offers innovation activities for college students.
Electrical and Electronic Training Base	600	Undergraduate teaching + open laboratory / 100%	7 types/110 0 sets	18	"Electronic Electrical Engineering Practice"and offer innovation activities for college students.
Computer Training Center	1200	Undergraduate teaching + open laboratory / 100%	1 type/700se ts	22	"Computer Fundamentals" practical experiments, and the establishment of college student innovation activities.
Metalwork ing Training Room	2000	Undergraduate teaching + open laboratory / 100%	11type/14 0sets	11	"Metalworking training" and the establishment of college students' innovation activities.
Surveying and Municipal	3185	Undergraduate teaching + open	460 types/100 0 sets	16	Engineering Surveying Experiment and

Experiment Training Center		laboratory / 100%			"Engineering Surveying Practice" and offer innovation activities for college students.
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## 2) Professional laboratory

The specialized courses offered in this major include experiments in water analysis chemistry, water treatment biology science experiments, hydraulics experiments, water quality engineering experiments, pump and pump station experiments, and building water supply and drainage engineering experiments, with a total of 34 experimental projects available, of which 24 are comprehensive, design-oriented, and innovative experiments, accounting for 70%. The total area of the laboratory for the water supply and drainage science and engineering major is 1289m<sup>2</sup>, with a total equipment and software value of 5.525 million yuan. The area of the experimental site and the number of equipment sets meet the needs of experimental teaching, and the experimental equipment and instruments are in good condition and can be updated in a timely manner, meeting all teaching requirements for the experimental units as per professional standards. The operational experimental groups consist of 2-4 people per group, with each class divided into 1-2 batches for experiments, and the status of the professional laboratories related to the specialized course experimental teaching is shown in Table D-8-2.

**Table D-8-2 Undergraduate Teaching Major Laboratory Basic Conditions Summary Table**

Laboratory name	Area (m <sup>2</sup> )	Open method and utilization rate	Types of equipment and quantity	Full-time and part-time management personnel	Main use
Fluid Mechanics Laboratory	169.87	Undergraduate teaching + open laboratory / 100%	9 types/34 sets	3	Hydraulics course experiments and student technology innovation experiments
Water Analysis Chemistry Laboratory	160.13	Undergraduate teaching + open laboratory / 100%	10 types/29 sets	2	"Experimental and Student Technological Innovation Experiments in Water Analytical Chemistry"

Pump and Pump Station Laboratory	79.5	Undergraduate teaching + open laboratory / 100%	9 types/13 sets	3	"Experiments on Pumps and Pump Stations and Student Technological Innovation Experiments"
Building Water Supply and Drainage Engineering Laboratory	82.51	Undergraduate teaching + open laboratory / 100%	4 types/4 sets	3	"Experimental, Practical Training and Student Technological Innovation Experiments in Building Water Supply and Drainage Engineering"
Water Quality Engineering Laboratory	199.17	Undergraduate teaching + open laboratory / 100%	25 types / 87 sets	4	"Water Quality Engineering Experiments" and Student Technological Innovation Experiments
Water Microbiology Laboratory	80.44	Undergraduate teaching + open laboratory / 100%	10 types/29 sets	3	"Biological Water Treatment" Experiments and Student Technological Innovation Experiments
Water Treatment Precision Instrument Room	105	Undergraduate teaching + open laboratory / 100%	35 types / 73 sets	4	Student Technology Innovation
Openness laboratory	52.4	Undergraduate teaching + open laboratory / 100%	11 types / 27 sets	3	Student Technology Innovation
Water Treatment	79.5	Undergraduate teaching + open	3 types/50 sets	3	"Fundamentals of AutoCAD", "Computer

Simulation Laboratory		laboratory / 100%			Applications in Water Supply and Drainage"
Water Quality Analysis Room	52.5	Undergraduate teaching + open laboratory / 100%	17 types/29 sets	2	Student Technology Innovation
Electronic balance/microscope room	26.54	Undergraduate teaching + open laboratory / 100%	7 types/60 sets	1	"Water Analytical Chemistry," "Water Treatment Biology" experiments and student technological innovation