School of Mathematics and Statistics Training Program for Academic Master's Degree (Implemented Since 2018)

1. Training objectives

1. Enable students to gain a good understanding of Marxist-Leninist Doctrine, Mao Zedong Thought, Deng Xiao-ping Theory, the important thought of Three Represents, Scientific Outlook on Development, and Xi Jinping's "The Thought on Socialism with Chinese Characteristics for a New Era", to support the Party's Basic Guideline and establish correct outlooks on the world, life and values, to have good ideological and political qualities and moral character, good humanistic literacy and academic accomplishment, and a strong sense of enterprise and responsibility, to observe law and discipline, to keep physically and mentally healthy, to be willing to serve the people, serve the CCP's governance and administration, serve the consolidation and development of the socialist system with Chinese characteristics, and serve the Reform and Opening-up and the construction of socialist modernization.

2. Have a solid command of the basic theory of mathematics and systematic professional knowledge. Be familiar with the emerging trends of this profession. Know how to use modern technologies such as computers and the Internet. Accept the lessons of independent scientific research. Be capable of independently engaging in scientific research, teaching, or other practical work for this subject.

3. Master a foreign language. Be able to use this foreign language to efficiently read the scientific and technological literature of this subject.

2. Research fields (see appendix)

3. Period of schooling

- 1. The schooling period of an academic master's degree in our institute is normally 3-4 years, including 1-1.5 years for course study.
- 2. Standards for early graduation (at least 2 years' study at school): The academic masters who apply for early graduation shall have studied all courses prescribed by training program and completed the examinations of other trainings. Applicants shall have excellent results and strong innovative ability. These students must publish one paper related to their subject in the SCI or EI journals, or publish two papers (or more) in the designated learned periodicals. These include papers that have received official letters of acceptance. The first author of a published paper must be from the School of Mathematics and Statistics of Wuhan University. If the paper is published together with others in Chinese, the student is required to be the first author. If the paper is published with others in a foreign language, the author can be arranged in alphabetical order by name according to the international general rules for mathematical papers. In addition, for papers in which a teacher is listed as the first author. If there are objections on the qualification of dissertations, the final arbitration may be made by the Academy Degree Committee.

4. Courses (see appendix) and credits

1. Classification of courses

Academic master's courses are classified as degree courses and elective courses

I. Degree courses

(1) Public required course for the whole school: ideological and political theory courses and the 1st foreign language (72 class hours, 2 credits). Ideological and political theory courses include one required course "Research on the Theory and Practice of Socialism with Chinese Characteristics" (36 class hours, 2 credits), and one elective course the "Dialectics of Nature" (18 class hours, 1 credit).

(2) Core curriculum courses: This refers to courses which all academic masters of the same first-class discipline should learn together, including the methodology of scientific research in this discipline and the common professional courses.

(3) Research oriented required courses: This refers to required courses of certain research field for academic masters.

II. Elective courses

Elective courses include public elective courses and professional elective courses. Public elective courses include courses in computer science, management, liberal arts, PE, career guidance etc. Academic master students should elect no more than 2 credits. Professional elective courses include courses within a specific discipline which can broaden students' scope of knowledge and deepen their specialized knowledge, as well as other courses designated by a teacher according to research fields.

2. Credits

Requires a total of 42 credits: Course credits 30, practical credits 2, paper credits 10.

Detailed course credits are provided below: Ideological and political theory course, 3 credits; First foreign language, 2 credits; Core curriculum courses, no less than 12 credits; Research oriented required courses, no less than 9 credits; the rest are credits for elective courses.

Choosing extra core curriculum courses as research oriented required courses is allowed. Choosing extra research oriented required courses as elective courses is allowed.

5. Required programs

1. Practice program

(1) Academic masters shall carry out social practice, professional practice or academic exchanges in school. The practice program includes campus practical teaching (such as computer operation and programming, case analysis, and simulation training) and off-campus practice (such as social survey, field research, and base practice). Off-campus professional practice normally starts in the 4th or 5th semester. Students shall submit a practice summary report after completing their professional practice, and receive 2 credits following approval.

(2) The experiences of taking part in practice and academic exchanges shall be recorded in the Examination Form for Practice of Academic Masters. Students can't take part in graduation defense until the practice and academic exchanges have been approved and recorded by the school and master school training department.

2. Opening report and mid-term examination

Mid-term examination and distribution are required at the end of the latter semester of the second academic year. Those with exceptional grades can directly pursue a doctoral degree, while

those who are not qualified will be dropped out. The rest who are qualified will continue studying for a Master's Degree.

At the end of the 3rd semester or the beginning of the 4th semester, students put forward the title and writing plan of their dissertation under their teachers' guidance, and make an opening report to a graduate steering group. Students can start research and paper writing after approval.

6. Dissertation

1. Academic masters must take part in at least one research program under the guidance of tutors and at least eight academic exchange activities (attending academic conferences and listening to academic reports at home and abroad), and publish at least one dissertation in the designated periodicals (papers receiving an official letter of acceptance shall be deemed to be published). Signature requirements are the same as those in the standard of early graduation.

2. According to the characteristics of their research fields, students can start collecting data and selecting a topic under the guidance of tutors starting from the 4th semester, and propose the title and writing plan of the dissertation, and have the opening report at the end of the 4th semester. Make a progress report in a related research group at the proper time during the 5th semester. Organize and print the dissertation in the 5th semester or at the beginning of the 6th semester. The dissertation requires a standardized format, correct proposition, careful reasoning, accurate data, fluent text, and must be defended strictly according to related regulations. Thesis defense must be organized at the end of the semester. Dissertation level should be good or above.

7. Training method

1. Tutors play a major role in the training of masters, together with guidance groups. Fully-utilize the tutor responsibility system, which is guided by scientific research and practical innovation. Pay full attention to every postgraduate's political thoughts, moral character, professional learning, physical and mental health, and scientific research ability. Teach students in accordance with their aptitude. Give them serious training and strict requirements. Emphasize the initiative and consciousness of postgraduates in the process of training. Apply more heuristic and seminar teaching methods. Focus on the cultivation of research and innovation abilities of postgraduates.

2. In the process of teaching, focus on academic training links such as subject research, special topic discussion and academic reports, and strengthen practical teaching links.

3. Strengthen the training of the literature reading and information retrieval abilities of

academic postgraduates. Make a list of the main classical works, frontier works, major learned periodicals and other catalogues that must be read and that can be selectively read by postgraduates of this major (discipline). Literature reading should be included in the scope of examination or checked in the form of reading reports, opening reports, etc.

4. The tutor (or postgraduate guidance group) should develop a reasonable individual training plan according to training methods and personalized principle within the first month of the first semester, and the plan needs to make specific arrangements for curriculum learning, practical activities, academic activities, scientific research and dissertation work, etc.

Appendix 1: Research Aras and Curriculum in pure math

Research Areas in pure math.

- 01 partial differential equations and its applications in physics, biology and medicine
- 02 Degenerate partial differential equations
- 03 Partial differential equations in fluid dynamics
- 04 Complex and hyper-complex boundary behaviour
- 05 Algebra and representation theory, number theory and algebraic geometry
- 06 functional analysis and its applications
- 07 several complex variables and complex geometry
- 08 differential geometry
- 09 geometric analysis
- 10 fractal geometry and dynamic systems

Pure Math (Code 070101) Curriculum for the Master

Cat	tegories	Course Codes		Courses	cre dits	hou rs	Semester	Remarks
			Theory	and Practice of Scientific Socialism	2	36	1	
	Pub		D	vialectics of Nature	1	18	1	
	lic re			Master English				
	quire		First	Doctor (Master) French				
	d course		Foreign	Doctor (Master) German	2	72	1	
			Language	Doctor (Master) Japanese	-			
				Doctor (Master) Russian				
		Remar	ks: This refe	rs to courses which all academ	ic mas	ters of	the same	
		first-c scienti	ss discipline should learn together, including the methodology of				Closed	
			ic research in	this discipline and the commo	n profe	essiona	l courses.	book
Б	Core curriculu		F	unctional Analysis	4	72	1	exam.
egree			Differentia	ble Manifolds and Topology	4	72	1	Select at least 3
cours				Modern Algebra	4	72	1	courses,
ses	n cou		Theo	4	72	1	among which Functional	
	rses			4	72	1		
			Ma	thematical Statistics	4	72	1	analysis is mandatory
			Advan	ced Numerical Analysis	4	72	1	
	Res	Remarks	: This refer	s to required courses of cer	rtain re	esearch	field for	
	earc	academi	e masters.					
	sh orie		General TI	heory of Partial Differential Equations	4	72	2	Salaat at
	nted req		Elliptic a	and Parabolic Differential Equations	3	54	2 or 3	least 3
	uired co		Quasiline C	ear Hyperbolic Systems of Conservation Laws	3	54	2 or 3	
	urses			Operator Theory	3	54	2 or 3	

Program

			ŀ	Iarmonic Analysis	3	54	2 or 3	
			Seve	ral Complex Variables	3	54	2 or 3	
			C	complex Geometry	3	54	2 or 3	
			Rie	emannian Geometry	3	54	2	
			Geor	netry of Submanifolds	3	54	3	
			Algebra a	and Representation Theory	3	54	2 or 3	
			Boundary	Value Problems for Analytic	3	54	2 or 3	
				Fractal Geometry	3	54	2	
	I	Note managen	es: Public ele nent, liberal a sł	ctive courses include courses i rts, PE, career guidance etc. A nould elect no more than 2 crea	n comj cademi lits.	outer so c maste	cience, er students	
	Public			Doctor (Master) English				
	; elect		Second	Master French	2	70	1	
	ive c		Language	Master German	2	12	1	
	ourses			Master Japanese				
				P.E.	1	36		
			In	struction of Career	1	36		
Flective courses	Р	Prot discipling specializ according	fessional ele e which can b ed knowledg g to research	ctive courses include cour proaden students' scope of know e, as well as other courses of fields.	ses w wledge lesigna	ithin a and de ted by	a specific eepen their a teacher	
	rofess		А	lgebraic Topology	3	54	3	
	ional el		Va Geome	riational Method, tric Variational Problems	2	54	3	
	ective		N	ficrolocal Analysis	2	54	2 or 3	
	; courses		Mathe	matical Theory on Fluid Mechanics	2	54	2 or 3	
	v 1		None	commutative Analysis	3	54	2 or 3	
			Mod	ern Complex Analysis	2	54	2 or 3	
			Complex E	quations and Its Applications	2	54	2 or 3	

	Geometric Structures on Spaces	2	54	2 or 3 or 4	
	Geometric Analysis	2	54	3 or 4	
	Algebraic Geometry	2	54	2 or 3	
	Clifford Analysis	2	54	2 or 3	
	Dynamical System	2	54	2 or 3	

Appendix 2: Research Areas and Curriculum in

computational math

Research Areas in computational math

- 01 Numerical Methods on Partial Differential Equations
- 02 Numerical Algebra
- 03 Multiscale Modeling and Simulation
- 04 Computational Materials
- 05 Partial Differential Equations and Optimal Control
- 06 Inverse Problems and Computation
- 07 Scientific and Industrial Computational Softwares
- 08 Computational Intelligence
- 09 Quantum Computation
- 10 Computational Fluid Dynamics
- 11 Computational Biology
- 12 Computer Sciences and Its Applications

Computational Math (Code 070102) Curriculum for the

Master Program

Cate	egories	Cour se Code s		Courses	cre dits	hou rs	Semest er	Remarks
			Theory a	nd Practice of Scientific Socialism	2	36	1	
	Publ		Di	alectics of Nature	1	18	1	
	ic rec			Master English				
	quired		First	Doctor (Master) French			1	
	cour		Foreign	Doctor (Master) German	2	72		
	ses		Language	Doctor (Master) Japanese				
				Doctor (Master) Russian				
Degree C	С	first-cl	ass discipline should learn together, including the methodology entific research in this discipline and the common professional courses.					Closed book exam.
	ore C		Functional Analysis			72	1	Select at
ourses	urricu	Different		ele Manifolds and Topology	4	72	1	least 3 courses,
•1	ulum		1	Modern Algebra	4	72	1	among
	Court		Theor	ry of Function Spaces	4	72	1	which Functional
	ses]	Measure Theory	4	72	1	analysis is
			Mat	hematical Statistics	4	72	1	mandatory
			Advanc	ed Numerical Analysis	4	72	1	
	Rese Requ	Remar acaden	ks: This refers	to required courses of certain	in rese	arch fi	eld for	
	arch uired		Modern Nu	merical Methods on PDEs	3	54	2 or 3	
	Orient Cours		Advand	ced Numerical Algebra	3	54	2 or 3	
	ted		Scientific a	nd Engineering Computing	3	54	2 or 3	

			Fini	te Element Methods	3	54	2 or 3	
	ч	No m	otes: Public elec	tive courses include courses in al arts, PE, career guidance etc.	compu Acade	iter scie	ence, aster	
	ubli		student	s should elect no more than $2 c$	redits.			
	electiv			Doctor (Master) English				
	ctive		Second	Master French	2	72	1	
	cout		Language	Master German	2	12		
	ses			Master Japanese				
				P.E	1	36		
			Ins	struction of Career	1	36		
Ele			Professional ele	ctive courses include course	s with	in a s	specific	
ctive		disci	pline which can	broaden students' scope of kn	owledg	ge and	deepen	
e cou	Professional elec	their	heir specialized knowledge, as well as other courses designated by a					
Irses		teacl	teacher according to research fields.					
			Multiscale r	nodeling and simulation	2	54	2 or 3	
			Introduction to	Computational Materials	2	54	2 or 3	
			Inverse Problem	2	54	2 or 3		
	tive c		Computati	onal Systems Biology	2	54	2 or 3	
	ourse		Computat	ional Fluid Dynamics	2	54	2 or 3	
	х х		Compu	tational Intelligence	2	54	2 or 3	
			So	oft Computing	2	54	2 or 3	
			Quantum In	formation and Quantum	2	54	2 or 3	
			Notes: Require	ed course for academic master	student	ts from		
	Z	inte	rdisciplinary bacl	ground or equal academic cap	acity.	Take	least 2	
	ake-		courses. No credi	ts are awarded, but a passing s	core is	require	ed.	
,	up co		-	Real Analysis				
	urses		Co	omplex Analysis				
			Differential Equa	tions on Mathematical Physics				
			Nu	merical Analysis				

Appendix 3: Research Areas and Curriculum in Probability and statistics

Research Areas in Probability and Statistics

- 01 Stochastic Analysis
- 02 Stochastic Processes
- 03 Stochastic Matrices
- 04 Applied Probability
- 05 Insurances and Mathematical Finance
- 06 Mathematical Statistics
- 07 Survival Analysis
- 08 High Dimensional Data Analysis

Probability and Statistics (Code 070103) Curriculum

Categories			Cour se Code s		credit s	hou rs	Semes ter	Remarks	
				Theory and	Practice of Scientific Socialism	2	36	1	
		ruo			Dialectics of Nature	1	18	1	
					Master English				
		quire		First	Doctor (Master) French				
		a cou		Foreign	Doctor (Master) German	2	72	1	
	1000			Language	Doctor (Master) Japanese				
					Doctor (Master) Russian				
			Remarl	s: This refers	s to courses which all academic r	nasters	of the	same	Closed
			first-cla	ass discipline and the second se	should learn together, including the source of the second se	the meth	nodolog	gy of	book exam.
De	Co	-	selentii		Functional Analysis	4	72	3. 1	least 3
gree	re Cu	-		Differenti	iable Manifolds and Topology	1	72	1	courses,
Cot	urricu	-		Differenti	4	72	1	among	
ırses	ılum	-			Modern Algebra	4	72	1	Functional
	Cou	_		The	eory of Function Spaces	4	72	1	analysis
	rses				Measure Theory	4	72	1	and
				M	Iathematical Statistics	4	72	1	measure
				Adva	nced Numerical Analysis	4	72	1	mandatory
		Kes	F	Remarks: This	refers to required courses of certa	in reseau	rch fie	ld for	
		earci	academ	nic masters.					
	Co			Adva	anced Probability Theory	3	72	2	At least 9
	urses	ented			Stochastic Processes	3	54	2	credits
		1 Keq			Stochastic Analysis	3	54	3	required.
		urred			Linear Model	3	54	2	

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			,	Time Series Analysis	3	54	3	
			Multi	variate Statistical Analysis	3	54	2	
		N	otes: Public el	ective courses include courses in co	mputer s	science	,	
		manag	gement, liberal a	arts, PE, career guidance etc. Acade	mic mas	ter stud	dents	
	- -		S	hould elect no more than 2 credits.		I		
	uon			Doctor (Master) English				
	c elec		Second	Master French	2	70	1	
	uve co		Foreign Language	Master German	2	72	1	
	ourses			Master Japanese				
				P.E	1	36		
			-	Instruction of Career	1	36		
Elec		Pı	rofessional elec	tive courses include courses within	a specif	fic disc	ipline	
tive		which	can broaden stu	Idents' scope of knowledge and dee	pen thei	r specia	alized	
Cor	P	knowle	edge, as well a	s other courses designated by a t	eacher a	accordi	ng to	
urses		researc	h fields.					
	rofess			Large Deviations	2	54	3	
	sional		Ν	Aathematical Finance	2	54	3	At least 4
	elect		No	n-parameter Estimation	2	54	3	credits required.
	ive co			Survival Analysis	2	54	3	
	ourses		Sampling	Techniques and Applications	2	54	3	
				Statistics Computing	2	54	2	
			Stochastic	Partial Differential Equations	2	54	2	
			Infinite Di	imensional System of Particles	2	54	2	
		Re	equired courses	for academic master students from	Interdisc	plinar	у	
		backgr	ound or equal a	cademic capacity. Take at least 2 co	ourses. N	o credi	its are	
Mak	e-up		awa	arded, but a passing score is require	d.	1		
Cou	rses			Real Analysis	4	72	1	
			Pr	obability and Statistics	4	72	1	

Appendix 4: Research Areas and Curriculum in Applied Math

Research Areas in Applied Math

- 01 Wavelet Analysis and Its Applications
- 02 Control theory of differential equations
- 03 Long Time Behavior, Controllability, Observability
- 04 Coding Theory and Information Security
- 05 Optimization Theory and Its Applications
- 06 Ill-posed Problems and Generalized Inverses Theory
- 07 Applied Nonlinear Analysis
- 08 Complex Networks: Theory and Applications
- 09 Nonlinear Dynamics

Applied Math (Code 070104) Curriculum for the Master

Categ	ories		Course Codes		Courses	cr ed its	hou rs	Semest er	Remarks
				Theory and	Practice of Scientific Socialism	2	36	1	
		hlid]	Dialectics of Nature	1	18	1	
		lic re			Master English				
	-	aurea		First	Doctor (Master) French				
		10011		Foreign	Doctor (Master) German	2	72	1	
		rses		Language	Doctor (Master) Japanese				
					Doctor (Master) Russian				
		F	Remarks:	This refers to	o courses which all academic m	aster	s of th	e same	
		f	first-class	discipline sho	buld learn together, including th	ne me	ethodol	ogy of	Closed
	Q	S	scientific r	esearch in this	s discipline and the common prof	essioi	nal cou	rses.	book
Deg	ore			-	Functional Analysis	4	72	1	exam. Select at
gree (Curri			Differenti	able Manifolds and Topology	4	72	1	least 3
ours	culun				Modern Algebra	4	72	1	courses,
es	1 Cou			The	eory of Function Spaces		72	1	among which
	rses				Measure Theory	4	72	1	Functional
				М	athematical Statistics	4	72	1	analysis is mandatory
				Adva	nced Numerical Analysis	4	72	1	2
		Hesearch	Remarks: academic r are allowed	This refers nasters. Requ 1.	to required courses of certain ired courses from other research	resea areas	of the	eld for school	
	Cou	One		Theory ar	nd Algorithm of Optimization	3	54	1 or 2	At least 6
	rses	nted k		Concise Cou	urse on Optimal Control Theory	3	54	2	credits
	-	leann		Wavelet A	Analysis and Its Applications	3	54	2	required.
		red		Graph	n theory and Applications	3	54	2	

Program

			Ill-posed	Problems and Generalized Inverses Theory	3	54	2	
			Number	r theory and Cryptography	3	54	2 or 3	
		Notes: manageme	Public electi ent, liberal arts shou	ve courses include courses in con , PE, career guidance etc. Acader Ild elect no more than 2 credits.	mpute nic n	er scier naster s	ice, tudents	
	Public elective courses		Second Foreign Language	Doctor (Master) English Master French Master German Master Japanese	2	72	1	
Ele	•			P.E.	1	36		
ctive			I	nstruction of Career	1	36		
ourses	Professional	Profe discipline specialized according	ssional electi which can bro d knowledge, to research fie	ve courses include courses aden students' scope of knowled as well as other courses desig lds.	withi ge an nated	n a s d deep by a	specific en their teacher	
	elective c		Algebraic Co Security	pplied Cryptography oding Theory and Information	3	54 54	2 or 3 2 or 3	
	ourses		Compl	ex Networks: Theory and Applications	3	54	2 or 3	
				Convex Analysis	3	54	2 or 3	
A		Requir backgrou	ed courses for nd or equal aca are awar	academic master students from I ademic capacity. Take at least 2 c ded, but a passing score is requir	nterd course red.	isciplir es. No o	nary credits	
ake-u	-		Ma	thematical Modelling	3	54	2	
tp course			Differenti	al Equations on Mathematical Physics	4	72	1 or 3	Research area
es			Mat	hematical Experiments	3	54	2	dependent
			Optimiza	tion Theory and Algorithms	4	72	1 or 3	

Appendix 5: Research Areas and Curriculum in Statistical Science

Research Areas in Statistical Science

- 1. Survival Analysis
- 2. Biostatistics
- 3. Regression analysis
- 4. Semiparametric and Nonparametric Statistics
- 5. Financial Statistics
- 6. Big data Analysis
- 7. Computational Statistics
- 8. Economic Statistics
- 9. Medical and Health Statistics
- 10. Comprehensive Evaluation of Health Performance

Statistical Science (Code 071400) Curriculum for the

Cate	gories	Cour se Code s	Courses	cre dits	hou rs	Semester	Remarks
	Public c		Theory and Practice of Scientific Socialism	2	36	1	5 credits in
	requ ourse		Dialectics of Nature	1	18	1	total
	ired		First Foreign Language	2	72	1	
	Core curr	Remarl first-cla scientif courses	ks: This refers to courses which all academ ass discipline should learn together, includin fic research in this discipline and the s.	ic mast	ers of method on pro	the same lology of fessional	Closed book exam, drafted by
	iculu		Measure theory	4	72	1	the exam
Degree co	ım Cou		Foundations of Modern Probability Theory	4	72	1	At least 12
	rses		Mathematical Statistics	4	72	1	credits required.
Irses			Statistical Computing	4	54	2	1
	Resea	Remarl academ	ks: This refers to required courses of cert nic masters.	tain res	search	field for	
	rch O		Sampling Techniques and Methods	3	54	2	
	riente		Linear Models	3	54	2	
	ed Re		Multivariate Statistical Analysis	3	54	2	At least 9
	quire		Nonparametric Statistics	3	54	2	required.
	d Cou		Time Series Analysis	3	54	3	
	rses		Advanced Numerical Analysis	3	54	2	
Elective	Public elective	Notes: manage student	Public elective courses include courses ement, liberal arts, PE, career guidance of s should elect no more than 2 credits.	in cor etc. Ac	nputer ademi	science, c master	
			Second Foreign Language	2	72	1	

Master Program

			P.E.	1	36			
			Instruction of Career	1	36			
		Pro	ofessional elective courses include cour	ses wi	thin a	specific		
		discipli						
		their sp						
	Prof	teacher	according to research fields.					
	èssic		Case Study	2	54	3		
	onal ele		Statistical Analysis of Qualitative Data	2	54	3	At least credits	4
	ective		Bayesian Statistics	2 54		3	required.	
	courses		Data Mining	2	54	4		
			Financial Mathematics	2	54	3		
			Survival Analysis	2	54	3		
	<	1	lotes: Required courses for academic maste	er stude	ents fro	m		
	ake-	Interdis	ciplinary background or equal academic ca	apacity	. Take a	at least 2		
4	all	cou	rses. No credits are awarded, but a passing	score	is requ	ired.		
	collins		Introduction to Probability		72	1		
	es.		Introduction to Mathematical Statistics		72	1 or 2		