

Status: PENDING

PROGRAM REQUEST
Mathematics - MATH-MS

Last Updated: Myers, Dena Elizabeth
06/02/2011

Fiscal Unit/Academic Org	Mathematics - D0671
Administering College/Academic Group	Mathematical And Physical Sci
Co-administering College/Academic Group	
Semester Conversion Designation	Converted with minimal changes to program goals and/or curricular requirements (e.g., sub-plan/specialization name changes, changes in electives and/or prerequisites, minimal changes in overall structure of program, minimal or no changes in program goals or content)
Current Program/Plan Name	Mathematics
Proposed Program/Plan Name	Mathematics - MATH-MS
Program/Plan Code Abbreviation	MATH-MS
Current Degree Title	Master of Science

Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program		45	30.0	30	0.0
Required credit hours offered by the unit	Minimum	36	24.0	24	0.0
	Maximum	45	30.0	30	0.0
Required credit hours offered outside of the unit	Minimum	0	0.0	0	0.0
	Maximum	9	6.0	6	0.0
Required prerequisite credit hours not included above	Minimum	0	0.0	0	0.0
	Maximum	0	0.0	0	0.0

Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

Program Learning Goals •

Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes

Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? No

A full assessment plan has been submitting using the survey form

Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

Pre-Major

Status: PENDING

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Does this Program have a Pre-Major? No

Attachments

- MS-ALL-May31.pdf
(Program Proposal. Owner: Kerler,Thomas)
- Mathematics MS cover letter.doc: NMS Division of Arts and Sciences cover letter
(Letter from the College to OAA. Owner: Andereck,Claude David)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Kerler,Thomas	01/14/2011 04:07 PM	Submitted for Approval
Approved	Shapiro,Daniel B	01/14/2011 08:38 PM	Unit Approval
Revision Requested	Andereck,Claude David	01/26/2011 05:11 PM	College Approval
Submitted	Kerler,Thomas	03/25/2011 11:32 AM	Submitted for Approval
Approved	Shapiro,Daniel B	03/26/2011 06:56 PM	Unit Approval
Revision Requested	Andereck,Claude David	05/13/2011 01:29 PM	College Approval
Submitted	Shapiro,Daniel B	05/13/2011 04:13 PM	Submitted for Approval
Revision Requested	Shapiro,Daniel B	05/13/2011 05:44 PM	Unit Approval
Submitted	Kerler,Thomas	05/22/2011 07:39 PM	Submitted for Approval
Approved	Shapiro,Daniel B	05/23/2011 11:53 AM	Unit Approval
Revision Requested	Andereck,Claude David	05/31/2011 05:03 PM	College Approval
Submitted	Kerler,Thomas	06/01/2011 09:42 AM	Submitted for Approval
Approved	Shapiro,Daniel B	06/01/2011 10:31 AM	Unit Approval
Approved	Andereck,Claude David	06/02/2011 04:02 PM	College Approval
Approved	Myers,Dena Elizabeth	06/02/2011 04:10 PM	GradSchool Approval
Pending Approval	Cameron,Erin Marie Soave,Melissa A	06/02/2011 04:10 PM	CAA Approval



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June 2, 2011

Dena Myers
Graduate School
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230 North Oval Mall
Campus

Dear Dena:

It is a pleasure to forward to you the proposal for the Masters of Science program in Mathematics under semesters. The Department undertook a thorough review of their graduate program. In the end, the resulting masters program is minimally changed from the quarter version. The curriculum provides considerable flexibility for students. Unlike the Masters of Mathematical Sciences, students are not admitted directly into the MS program.

Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on January 26, 2011. Feedback from these discussions has been incorporated in the proposal.

If you have any questions, I would be happy to address them.

Sincerely,

A handwritten signature in black ink, appearing to read "David Andereck".

David Andereck
Professor of Physics
Associate Dean of Natural and Mathematical Sciences, College of Arts and Sciences



To: Office of Academic Affairs
From: Luis Casian, Chair, Department of Mathematics
Date: January 2011
Re: Semester program proposals for degree programs in the Department of Mathematics

The following programs in the Department of Mathematics are being converted from the quarter system to the semester system, with minimal changes:

1. BS in Mathematics
2. BA in Mathematics
3. Minor in Mathematics
4. BS in Actuarial Science
5. BA in Actuarial Science
6. MS in Mathematics
7. MMS in Mathematics
8. PhD in Mathematics

During the past year, the Department's Undergraduate Committee and Graduate Studies Committee have worked on semester conversions of those programs. This process involved frequent consultations with faculty members involved with particular courses or course sequences, and involved repeated editing of the conversion documents.

Many changes will also be made to the structure and flow of freshman-level math courses. Since those courses do not involve students enrolled in those eight programs, their changes are not discussed in these program conversion documents.

These proposed conversion plans and transition policies were approved by the Undergraduate and Graduate Committees, and were discussed during a faculty meeting in December 2, 2010. The semester conversion plans were approved by the Department's tenure-track faculty, by a vote of 49 yes and 0 no.

A handwritten signature in blue ink, appearing to read "Luis Casian".

Luis Casian
Professor and Chair

Program Rationale

Master of Sciences - Mathematics

- The semester hours (30 and 33) for required coursework are equivalents to the requirements in quarter hours (45 and 50) for thesis and non-thesis option respectively.
- The list of allowable courses is extended and updated by courses that have been typically granted the Graduate Studies Committee as approved coursework in past petitions by candidates. An old CS courses that are no longer offered have been removed.
- A few more minor details are clarified such as minimum grade for approved course work as well as whether comprehensive courses count towards coursework.
- The comprehensive requirement for the thesis option is also equivalent to quarter version, expect that 2-quarter requirement of 750-751/770-771 is extended to 2-semester requirement 6211-6212/6111-6112. This is option is typically only used by PhD students who also use 750-751/770-771 to fulfill a breadth requirement, which will become 2-semester requirements.
- The comprehensive requirement for the non-thesis option reflects and is equivalent to current standing practice, although the latter is not properly documented in the current version of the Handbook.

Table of Mathematics Graduate Semester Courses

The tables in the following four pages list the semester courses proposed by the graduate program of the mathematics department. They are grouped by sequences and subjects together with the quarter equivalent courses and sequences.

New and Discontinued Courses

The only new course is Math 5603 (Numerical Linear Algebra) although this also fits into an existing sequence. The only course sequence that is not continued, although it was regularly taught during the academic year until now, is Math 872-874 (Group Theory). See the included justification.

Several quarter courses have been discontinued and were not converted since they have not been taught in several years. They include Math 650 (Principles of Mathematical Analysis), Math 667 (Introduction to the Mathematics of Cryptography), Math 669 (Introduction to Number Theory), Math 705 (Special Functions), Math 712-714 (Applied Functional Analysis I-III), Math 767-768 (Approximation Theory I-II), and Math 863 (Potential Theory).

Further summer courses were discontinued and not converted since they were part of our Headstart program which due to budget reasons has been restructured and no longer uses regularly scheduled classes. These include Math 735, 736 (Teaching College Mathematics), Math 787.xx (Graduate Problem Seminars), and Math 609 (Applications of Mathematical Software).

Finally a few quarter courses in topology and geometry do not occur in the conversion table due to the new topology/geometry curriculum that started on AU 2010. Particularly, Math 655-657 (Elementary Topology I-III) and Math 860 (Algebraic Topology I) were converted or absorbed into the current Math 640 and Math 756-757 quarter courses. These, in turn, have been converted to Math 5801, 6801, and 6802 in the semester proposal.

Course Numbers without set Syllabi

There is a mild reorganization of topics courses that more adequately reflects the standard areas in mathematics represented in our department. Topics courses are scheduled according to availability of faculty, students demand, and program policies by the Graduate Studies Committee.

Typically six topics courses have been approved per year in recent times. In the semester conversion the target number will be respectively four semester courses so that the investment of hours and faculty will remain about the same.

A few more course numbers for reading, group studies, and research have been listed in order give more flexibility with our various graduate tracks. Particularly, an internship number is introduced for the MMS tracks in order to account for the internships required for the intermediate summer between the first and second years.

Credit Hour Balances

The table accounts for the overall balance of credit hours as follows.

For each semester (quarter) course the number of semester (quarter) credit hours and frequency of offering are recorded. (e.g., Freq.=1 means offered annually, Freq.=2 means offered biennially). The average annual semester (quarter) credit hours invested in the course is computed as $Ave\ Cred = Credit / Freq.$

For each group the total annual average quarter credits of the quarter courses are computed. Similarly the semester credits for the semester courses, which are then converted 2:3 to quarter credits. (results in blue numbers for the quarter and semester versions).

The difference (in average annual quarter credits) is recorded in the DIFF column. Increases in credits due to conversion are in red and decreases in green.

Summary

There is an overall increase of about 6 quarter credit hour equivalents in planned regular offerings of mathematics graduate courses. If the missing summer courses are counted in we have indeed a decrease in offered hours.

There are two notable shifts in credit hours. The first is an increase at the Master (600/5000) level at the cost of a decrease of offered hours at the PhD (700/6000) level. This is motivated by the introduction of our new MMS program, and a respective reduction in size of our PhD program. The second is a shift from topology to geometry hours within the topology/geometry curriculum. See the included justifications.

Semester Conversion Table for Mathematics Graduate Courses

Semester Transcr Name	QUARTER				SEMESTER				DIFF	Justification
	Num	Credit	Freq	Ave. Cred.	Num	Credit	Freq	Ave. Cred.		
Ess Numer Methods	606	3	1	3	5602	3	1	3		Quarter sequence Math 606, 607 (at 3 and 5 q-cr) converted to semester sequence Math 5602, 5601 (3 s-cr each)
Computational PDEs	607	5	1	5	5601	3	1	3		
<i>Balance (in quarter credits)</i>				8				9	1.0	
Numer Linear Algeb				0	5603	3	1	3		New Course. Limitations in hardware require better algorithms in handling of large data, particularly large matrices. The demands on training successful students in computing have thus change and are addressed with this course.
<i>Balance (in quarter credits)</i>				0				4.5	4.5	
Math Mod Bio Proc	865L	3	1	3	5651	3	1	3		Math 865L (3 q-cr) provides the foundation for the required summer internships of our Math-Biology MS program. The time allotted in Mathy 865L was too short so that it is extended to the 3 hour semester course Math 5651.
<i>Balance (in quarter credits)</i>				3				4.5	1.5	
Meth Relativ Thy 1 & 2	665	4	1	4	5756	3	1	3		Quarter sequence Math 665, 666 (4 q-cr each) converted to semester sequence Math 5756, 5757 (3 s-cr each)
	666	4	1	4	5757	3	1	3		
<i>Balance (in quarter credits)</i>				8				9	1.0	
Variat & Tens Calc	701	5	2	2.5	5451	3	2	1.5		Conversion of quarter course Math 701 (5 q-cr) to semester course Math 5451 (3 s-cr)
<i>Balance (in quarter credits)</i>				2.5				2.25	-0.3	
Appl Diff Eqs 1 & 2	615	3	1	3	5401	3	1	3		Quarter sequence Math 615, 616, 617 (3 q-cr each) converted to semester sequence Math 5401, 5402 (3 s-cr each)
	616	3	1	3	5402	3	1	3		
	617	3	1	3						
<i>Balance (in quarter credits)</i>				9				9	0.0	
Intro Set Theory	647	3	1	3	5001	3	1	3		Math 647 (3 q-cr) converted to Math 5001 (3 s-cr). While Math 647 was an introduction to set theory targeted at logic students, Math 5001 will be a general introduction to basic set theoretic techniques used throughout mathematics. The quarter sequence Math 648, 649 converted to semester course Math 5051 (3 s-cr).
Intro Math Logic	648	3	1	3	5051	3	1	3		
	649	3	1	3						
<i>Balance (in quarter credits)</i>				9				9	0.0	
Intro Real Analy 1 & 2	651	5	1	5	5201	5	1	5		Quarter sequence Math 651, 652, 653 (5 q-cr each) converted to semester sequence Math 5201, 5202 (5 s-cr each).
	652	5	1	5	5202	5	1	5		
	653	5	1	5						
<i>Balance (in quarter credits)</i>				15				15	0.0	
Int Compl Analysis	660	5	1	5	5221	3	1	3		Conversion of quarter course Math 660 (5 q-cr) to semester course Math 5221 (3 s-cr). Increase in time from 654 to 5251 is balanced with decrease in time from 660 to 5221.
Complex Var & App	654	3	1	3	5251	3	1	3		
<i>Balance (in quarter credits)</i>				8				9	1.0	
Finite Linear Math	601	3	1	3	5101	3	1	3		Quarter sequence Math 601, 602, 603 (3 q-cr each) converted to semester sequence Math 5101, 5102 (3 s-cr each)
Infin Linear Math	602	3	1	3	5102	3	1	3		
	603	3	1	3						
<i>Balance (in quarter credits)</i>				9				9	0.0	
Algebra 1 & 2	670	5	1	5	5111	5	1	5		Quarter sequence Math 670, 671, 672 (5 q-cr. each) converted to semester sequence Math 5111, 5112 (5 s-cr. each)
	671	5	1	5	5112	5	1	5		
	672	5	1	5						
<i>Balance (in quarter credits)</i>				15				15	0.0	

Semester Conversion Table for Mathematics Graduate Courses

Semester Transcr Name	QUARTER				SEMESTER				DIFF	Justification
	Num	Credit	Freq	Ave. Cred.	Num	Credit	Freq	Ave. Cred.		
Intro Number Thy	683	4	1	4	5152	3	1	3	0.5	Conversion of quarter course Math 683 (4 q-cr) to semester course Math 5152 (3 s-cr).
Gen Topol & Knots	640	3	1	3	5801	3	1	3		Quarter sequence Math 640, 641, 642 (3 q-cr each) converted to semester sequence Math 5801, 5702 (3 s-cr each)
Curves & Surfaces	641	3	1	3	5702	3	1	3		
	642	3	1	3						
<i>Balance (in quarter credits)</i>				9				9	0.0	
Num Meth Sc Comp 1 & 2	707	3	1	3	6601	4	1	4		Quarter sequences Math 727, 728, 729 (1 q-cr each) and Math 707, 708, 709 (3 q-cr each) are combined and converted to semester sequence Math 6601, 6602 (3 s-cr each)
	708	3	1	3	6602	4	1	4		
	709	3	1	3						
	727	1	1	1						
	728	1	1	1						
	729	1	1	1						
<i>Balance (in quarter credits)</i>				12				12	0.0	
Appl Comp Vars 1 & 2	804	3	2	1.5	7651	3	2	1.5		Quarter sequence Math 804, 805, 806 (3 q-cr each) converted to semester sequence Math 7651, 7652 (3 s-cr each)
	805	3	2	1.5	7652	3	2	1.5		
	806	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5	0.0	
Computational PDE 1 & 2	807	3	2	1.5	7611	3	2	1.5		Quarter sequence Math 807, 808, 809 (3 q-cr each) converted to semester sequence Math 7611, 7612 (3 s-cr each)
	808	3	2	1.5	7612	3	2	1.5		
	809	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5	0.0	
Ordin Differ Eqs 1	715	3	1	3	6411	3	1	3		Quarter sequence Math 715, 716, 717 (3 q-cr each) converted to semester sequence Math 6411, 6451 (3 s-cr each)
Part Differ Eqs 1	716	3	1	3	6451	3	1	3		
	717	3	1	3						
<i>Balance (in quarter credits)</i>				9				9	0.0	
Ordin Differ Eqs 2 & 3	820	3	2	1.5	7412	3	2	1.5		Quarter sequence Math 820, 821, 822 (3 q-cr each) converted to semester sequence Math 7412, 7413 (3 s-cr each)
	821	3	2	1.5	7413	3	2	1.5		
	822	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5	0.0	
Part Differ Eqs 2 & 3	835	3	2	1.5	7452	3	2	1.5		Recent changes in the composition of our faculty and student interest have increased the need in a more thorough training in PDE. The two quarter sequence Math 835-836 thus needed to be extended to a standard two semester sequence Math 7452-7453.
	836	3	2	1.5	7453	3	2	1.5		
<i>Balance (in quarter credits)</i>				3				4.5	1.5	

Semester Conversion Table for Mathematics Graduate Courses

CAA
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Semester Transcr Name	QUARTER				SEMESTER				DIFF	Justification
	Num	Credit	Freq	Ave. Cred.	Num	Credit	Freq	Ave. Cred.		
Adv Math Logic 1-4	745	3	1	3	6001	3	2	1.5	0.0	Quarter sequence Math 745, 746, 747 (3 q-cr each, offered annually) converted to two-year semester sequence Math 6001, 6002, 6003, 6004 (each course 3 s-cr and offered biennially)
	746	3	1	3	6002	3	2	1.5		
	747	3	1	3	6003	3	2	1.5		
					6004	3	2	1.5		
<i>Balance (in quarter credits)</i>				9				9		
Thy Probability 1 & 2	722	4	2	2	6251	4	2	2	0.0	Quarter sequence Math 722, 723, 724 (4 q-cr each) converted to semester sequence Math 6251, 6252 (4 s-cr each)
	723	4	2	2	6252	4	2	2		
	724	4	2	2						
<i>Balance (in quarter credits)</i>				6				6		
Real Analysis 1 & 2	750	5	1	5	6211	5	1	5	0.0	Quarter sequence Math 750, 751, 752 (5 q-cr each) converted to semester sequence Math 6211, 6212 (5 s-cr each)
	751	5	1	5	6212	5	1	5		
	752	5	1	5						
<i>Balance (in quarter credits)</i>				15				15		
Functnl Analysis 1 & 2	857	3	2	1.5	7211	3	2	1.5	0.0	Functional analysis quarter sequence was offered as Math 857 in autumn and continued as Math 961 in winter and spring and thus equivalent to a 3 quarter sequence of 3 q-cr each. It is converted to semester sequence Math 7211, 7212 (3 s-cr each)
	961 (Wi)	3	2	1.5	7212	3	2	1.5		
	961 (Sp)	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5		
Ergodic Theory 1 & 2	931	3	2	1.5	7221	3	2	1.5	0.0	Ergodic Theory quarter sequence was offered as Math 931, 932 in autumn and winter and as Math 950 in spring and thus equivalent to a 3 quarter sequence of 3 q-cr each. It is converted to semester sequence Math 7221, 7222 (3 s-cr each)
	932	3	2	1.5	7222	3	2	1.5		
	933/950	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5		
Complex Analysis 1 & 2	753	5	1.5	3.3333333	6221	3	1.5	2	-0.7	Quarter sequence Math 753, 754 (5 q-cr each) converted to semester sequence Math 6221, 6222 (3 s-cr each)
	754	5	1.5	3.3333333	6222	3	1.5	2		
<i>Balance (in quarter credits)</i>				6.6666667				6		
Combin Graph Thy 1 & 2	775	5	1	5	6501	5	1	5	0.0	Quarter sequence Math 775, 776, 777 (5 q-cr each) converted to semester sequence Math 6501, 6502 (5 s-cr each)
	776	5	1	5	6502	5	1	5		
	777	5	1	5						
<i>Balance (in quarter credits)</i>				15				15		
Abstract Algebra 1 & 2	770	5	1	5	6111	5	1	5	0.0	Quarter sequence Math 770, 771, 772 (5 q-cr each) converted to semester sequence Math 6111, 6112 (5 s-cr each).
	771	5	1	5	6112	5	1	5		
	772	5	1	5						
<i>Balance (in quarter credits)</i>				15				15		
Commutativ Algebra	978	3	2	1.5	6151	3	2	1.5	0.5	Quarter course Math 978 (2-5 q-cr) converted to semester course Math 6151 (3 s-cr). This course will be offered, by demand, biennially during school year or during summer.
NonCommut Algebra	982	5	2	2.5	6152	3	2	1.5		
<i>Balance (in quarter credits)</i>				4				4.5		

Semester Conversion Table for Mathematics Graduate Courses

Semester Transcr Name	QUARTER				SEMESTER				DIFF	Justification
	Num	Credit	Freq	Ave. Cred.	Num	Credit	Freq	Ave. Cred.		
Algebr Numb Theory	780	3	2	1.5	7121	3	2	1.5	0.0	Quarter sequence Math 780, 781, 782 (3 q-cr each) converted to semester sequence Math 7121, 7122 (3 s-cr each)
Analyt Numb Theory	781	3	2	1.5	7122	3	2	1.5		
	782	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5		
Basic Algeb Geomet	840	3	2	1.5	7141	3	2	1.5	0.0	Quarter sequence Math 840, 841, 842 (3 q-cr each) converted to semester sequence Math 7141, 7142 (3 s-cr each)
Adv Algeb Geomet	841	3	2	1.5	7142	3	2	1.5		
	842	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5		
Algebr Topology 1 & 2	756	4	1	4	6801	3	1	3	-3.0	Quarter seq. Math 756,757,758 (4 q-cr ea) → semester seq. Math 6801,6802 (3 s-cr ea). Hour reductions for topology courses (6801,6802,7811) in favor of increases for geometry courses (6701,6702,7711,7721) correct curricular imbalance between fields.
	757	4	1	4	6802	3	1	3		
	758	4	1	4						
<i>Balance (in quarter credits)</i>				12				9		
Differen Manifolds	765	4	1	4	6701	3	1	3	1.0	Quarter seq. Math 765, 766 (4 q-cr ea) → semester seq. Math 6701, 6702 (3 s-cr ea). Hour reductions for topology courses (6801,6802,7811) in favor of increases for geometry courses (6701,6702,7711,7721) correct curricular imbalance between fields.
	766	4	1	4	6702	3	1	3		
<i>Balance (in quarter credits)</i>				8				9		
Different Geometry	851	3	2	1.5	7711	3	2	1.5	1.5	Quarter seq. Math 851, 852 (3 q-cr ea) → semester seq. Math 7711, 7721 (3 s-cr ea). Hour reductions for topology courses (6801,6802,7811) in favor of increases for geometry courses (6701,6702,7711,7721) correct curricular
	852	3	2	1.5	7721	3	2	1.5		
<i>Balance (in quarter credits)</i>				3				4.5		
Differ Topology 1 & 2	866	3	2	1.5	7851	3	2	1.5	0.0	Quarter sequence Math 866, 867, 868 (3 q-cr each) converted to semester sequence Math 7851, 7852 (3 s-cr each).
	867	3	2	1.5	7852	3	2	1.5		
	868	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				4.5		
Homotopy Theory	861	3	2	1.5	7811	3	2	1.5	-0.8	Quarter sequence Math 861, 862 (3 q-cr ea) → semester course Math 7811 (3 s-cr). Hour reductions for topology courses (6801,6802,7811) in favor of increases for geometry courses (6701,6702,7711,7721) correct curricular imbalance between fields.
	862	3	2	1.5						
<i>Balance (in quarter credits)</i>				3				2.25		
Lie Algebras	854	3	2	1.5	7161	3	2	1.5	1.5	The Lie theory sequence satisfies a strong cross-disciplinary demand and absorbs several topics from the discontinued Math 872-874 sequence. The 2 quarter sequence Math 854-855 (3 q-cr) is thus extended to a semester sequence Math 7161-7162 (3 s-cr).
Lie Grps & Rep Thy	855	3	2	1.5	7162	3	2	1.5		
<i>Balance (in quarter credits)</i>				3				4.5		
(Group Theory)	872	3	2	1.5	no replacement				-4.5	Anticipated retirements and departures of faculty in the area led to the decision not to continue the course sequence under semesters.
	873	3	2	1.5						
	874	3	2	1.5						
<i>Balance (in quarter credits)</i>				4.5				0		

Semester Transcr Name	QUARTER		SEMESTER		Justification
	Num	q-cr	Num	S-cr	
Topics Courses (offered by student demand and faculty availability)					
Tpx foundations	949	2-5	8000	3	Conversion with uniformization of hours
Tpx algebra	982	2-5	8110	3	Conversion with uniformization of hours
Tpx number theory	983	2-5	8120	3	Conversion with uniformization of hours
Tpx algebr geomet	975	2-5	8140	3	Conversion with uniformization of hours
Tpx represent thy	970	2-5	8160	3	Conversion with uniformization of hours
Tpx real analysis	950	2-5	8210	3	Conversion with uniformization of hours
Tpx complex analys	951	2-5	8220	3	Conversion with uniformization of hours
Tpx probability	939	2-5	8250	3	Conversion with uniformization of hours
Tpx financ math			8300	3	New semester topics course. Financial mathematics is currently a strong hiring priority so that a topics course should be in place for this.
Tpx ordin diff eqs			8410	3	New semester topics course. Increased faculty representation in differential equations requires the addition of a topics course in ODE.
Tpx part diff eqs			8420	3	New semester topics course). Increased faculty representation in differential equations requires the addition of a topics course in PDE.
Tpx combinatorics	846	2-5	8500	3	Conversion with uniformization of hours
Tpx applied math	865	2-5	8610	3	Conversion with uniformization of hours
Tpx math biology			8650	3	New semester topics course. Mathematical Biology has experienced strong increase in faculty and visibility via the Math Bioscience Institute. Thus a topics course number should be available.
Tpx differ geomet	957	2-5	8710	3	Conversion with uniformization of hours
Tpx Lie theory	981	2-5	8750	3	Conversion with uniformization of hours
Tpx topology	953	2-5	8800	3	Conversion with uniformization of hours
Individual & Group Studies					
Individual Studies	693	1-5	5193	1-5	Conversion
Individual Studies		1-5	6193	1-5	In order to improve training of our intermediate PhD students looking for thesis topics additional opportunities to take individual studies classes are beneficial.
Individual Studies	893	1-5	7193	1-5	Conversion
Group Studies	694	1-5	5194	1-5	Conversion
Group Studies		1-5	6194	1-5	In order to improve training of our intermediate PhD students looking for thesis topics additional opportunities to take group studies classes are beneficial.
Group Studies	894	1-5	7194	1-5	Conversion

Semester Transcr Name	QUARTER		SEMESTER		Justification
	Num	q-cr	Num	S-cr	
Research & Internship					
Intern Math Sci	(693)	1-5	6191	1-5	The internship and practical experience has become an integral part of the new Master of Mathematical Sciences degree program. Students typically take the internship by individual arrangement in the summer between first and second year.
Research			6999	1-19	With the introduction of our MMS degree program we expect to have up to 20 students write a Master thesis so that a separate course number is adequate.
Research	999	1-19	8999	1-19	Conversion
Research			6998	1-19	Similar as for 7998 but specifically for MS and MMS level students
Research			7998	1-19	On occasion graduate students work with professors on externally funded research projects without necessarily using this towards their PhD work.
Research			8998	1-19	Similar as for 7998 but for more advanced PhD students.

Transition Policy

Master of Sciences - Mathematics

- The comprehensive requirements, as described in the new Handbook Draft, for semesters are in one-to-one correspondence to those for quarters.
- All courses that are approved course work under the quarter rules have semester equivalents that count as approved courses in the semester rules. See the attached list of semester courses.
- The hours requirements are translated with the standard $2/3$ factor.

MS Sample Conversion Calendar

We do not admit students who only seek the regular MS degree. This degree is reserved for students admitted to the PhD program who either leave the program before finishing their PhD-degree or who want to pick up the degree along the way. Therefore, a realistic schedule would be the submitted PhD Sample Conversion Calendar terminated somewhere after the second year. Nevertheless, we display below a sample conversion calendar for the MS-degree via the thesis option. The hours in the right columns are only those from required and elective courses but not research or individual studies hours. For our thesis option 45 quarter or 30 semester hours from required and elective courses are needed. Since the regular time to degree is two years only the incoming class of 2011 is relevant.

	Term	Admitted 2011	Quarter Hours	Semester Hours
Year 1	Au, Wi, Sp	Math 670, 671, 672 (Algebra, MS level)	30	20
		Math 651, 652, 653 (Analysis, MS level)		
Year 2	Autumn	Math 5221 (Complex Analysis, Elective 1)	13.5	9
		Math 5801 (Topology, Elective 2)		
Year 2	Spring	Math 5201 (Set Theory, Elective 3)	4.5	3
		Math 5051 (Logic)		
		Math 5999 (Thesis research)		
		Thesis defense		

Master of Science in Mathematics

DRAFT of Semester Version of Handbook

Thesis Option

- 1) **Approved Course Work:** Complete 30 semester credit hours hours of approved course work with a grade of “C-” or higher. See list of approved courses below.
- 2) **Analysis Comprehensive Requirement:** Fulfill *one* of the following
 - a) Pass the Qualifying Exam in Analysis at the MS-level.
 - b) Complete the Math 5201-5202 or the Math 6211-6212 sequence with grade “B-” or higher in each course and a “B” average or higher in the sequence.
- 3) **Algebra Requirement:** This can be fulfilled in *one* of the following ways
 - a) Pass the Qualifying Exam in Algebra at the MS-level.
 - b) Complete the Math 5111-5112 or the Math 6111-6112 sequence with grade “B-” or higher in each course and a “B” average or higher in the sequence.
- 4) **Master Thesis & Examination:** In addition to the program requirements above, the university requires[§] the following:
 - a) A Master examination committee consisting at least of the advisor (faculty with level M status or higher in mathematics) and another OSU graduate faculty member.
 - b) A written thesis, which needs to follow university formatting guidelines, be approved by the committee, and be submitted to the Graduate School and OhioLink.
 - c) An oral examination by the committee following the approval of the thesis.Additional faculty can serve on the examination committee and the examination may include an extra written portion. There are no further program requirements on the form or content of the Master thesis and examination.

Non-Thesis Option

- 1) **Approved Course Work:** Complete 33 semester credit hours hours of approved course work with a grade of “C-” or higher. This has to include at least one two semester sequence. See list of approved courses below.
- 2) **Analysis Comprehensive Requirement:**

Pass the Qualifying Exam in Analysis at the MS-level.
- 3) **Algebra Comprehensive Requirement:**

Pass the Qualifying Exam in Algebra at the MS-level.
- 4) **Master Examination:** In addition to the program requirements above, the university requires[§] the following:
 - a) A Master examination committee consisting at least of the advisor (faculty with level M status or higher in mathematics) and another OSU graduate faculty member.
 - b) A written examination of at least four hours.Additional faculty can serve on the examination committee and the examination may include an extra oral portion. There are no further program requirements on the form or content of the Master examination.

Candidacy Option

Ph.D.-students who pass their candidacy examination can apply for the MS-degree without any further program requirements.

§ For details Section VI of the [Graduate School Handbook](#)

Approved Courses

- Math 5201, Math 5202 (Introduction to Real Analysis 1 & 2)
- Math 5111, Math 5112 (Algebra 1 & 2)
- Math 5630, Math 5631 (Life Contingencies 1 & 2)
- Math 5632 (Financial Economics)
- Math 5001 (Introduction to Set Theory)
- Math 5051 (Introduction to Mathematical Logic)
- Stat 6801, Stat 6802 (Statistical Theory I & II)
- Stat 6302 (Theory of Statistical Analysis)
- Math 5221 (Introduction to Complex Analysis)
- Math 5801 (General Topology and Knot Theory)
- Math 5702 (Curves and Surfaces in Euclidean Three Space)
- Math 5401, Math 5402 (Applied Differential Equations 1 & 2)
- Math 5601 (Essentials of Numerical Methods)
- Math 5602 (Computational Partial Differential Equations)
- Math 5651 (Mathematical Modeling of Biological Processes)
- All 6000 and 7000 level mathematics courses.

The credits from Analysis and Algebra courses used to fulfill the comprehensive requirements may also be used towards the coursework requirement.

Additional courses may be approved by the Graduate Studies Committee in order to fulfill the coursework requirement. However, approval needs to be sought before the courses are taken.

Graduation Procedures

The university form "[Application to Graduate – Master's Degree](#)" issued by the Graduate School must be completed by both the students and the advisor. It has to be returned to the Graduate School **no later than the second Friday of the second week of the semester**, and a copy needs to be submitted to the Mathematics Graduate Office.

Upon submission of the application the Graduate School will generate an approval form on which the committee indicates final approval of the degree. The form needs to be submitted to the Graduate School immediately after the exam, and a copy should be given to the Mathematics Graduate Office.

Admission

All students who have been admitted with Ph.D. as intended degree are eligible to earn this degree upon completion of all requirements.

Students admitted with the Master of Mathematical Science as intended degree are not eligible to pursue the Master of Science degree.

Graduate students from math-related Ph.D. programs at OSU can apply to transfer into the mathematics program for one quarter for the purpose of earning an MS degree if they have fulfilled all program requirements (coursework and comprehensive requirements) and the prospective mathematics advisor has written a note of support to the department.

Non-OSU students are normally not admitted to the mathematics graduate program if their only degree intent is the Master of Science.

Appendix: Sample Curriculum

(for Thesis Option)

	Term		Semester Hours
Year 1	Autumn	Math 5111 (Algebra, MS level) Math 5201 (Analysis, MS level) (each course has 5 quarter credits)	10
	Spring	Math 5112 (Algebra, MS level) Math 5202 (Analysis, MS level) (each course has 5 quarter credits)	10
Year 2	Autumn	Math 5221 (Complex Analysis, Elective 1) Math 5801 (Topology, Elective 2) Math 5201 (Set Theory, Elective 3) (each course has 3 semester credits)	9
	Spring	Math 5051 (Logic) (3 sem cred) Math 5999 (Thesis research) Thesis defense	3 (+research hrs)