

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
Program/Plan Code Abbreviation	MATH-BS
Current Degree Title	Bachelor 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		53	35.3	38	2.7
Required credit hours offered by the unit	Minimum	40	26.7	31	4.3
	Maximum	48	32.0	34	2.0
Required credit hours offered outside of the unit	Minimum	5	3.3	4	0.7
	Maximum	19	12.7	14	1.3
Required prerequisite credit hours not included above	Minimum	15	10.0	10	0.0
	Maximum	30	20.0	23	3.0

Explain any change in credit hours if the difference is more than 4 semester credit hours between the values listed in columns B and C for any row in the above table

Minimum and maximum in row #2 come from different sub-plans. Within each sub-plan the change in semester credit hours is less than 4.

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

- Learn conceptual frameworks needed to study higher mathematics, including an introduction to mathematical reasoning, and an understanding of how to read and write proofs.
- Acquire basic mastery of core areas of mathematics, including calculus, analysis and algebra.
- Develop powerful mathematical problem solving skills.
- Learn to communicate mathematical understanding effectively.
- Become proficient in chosen tracks within the major.

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? Yes

Summarize how the program's current quarter-based assessment practices will be modified, if necessary, to fit the semester calendar.
Assessment practices will have minimal modifications.

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.

Program Specialization/Sub-Plan Name Theoretical (Existing)
Program Specialization/Sub-Plan Goals

Program Specialization/Sub-Plan Name Education (Existing)
Program Specialization/Sub-Plan Goals

Program Specialization/Sub-Plan Name Bio-Math (Existing)
Program Specialization/Sub-Plan Goals

Program Specialization/Sub-Plan Name Applied (Existing)
Program Specialization/Sub-Plan Goals

Program Specialization/Sub-Plan Name Financial (Existing)
Program Specialization/Sub-Plan Goals

Pre-Major

Does this Program have a Pre-Major? No

Attachments

- Math.BS.pdf: documentation
(Program Rationale Statement. Owner: Shapiro, Daniel B)
- Mathematics BS and BA cover letter.doc: NMS Division of Arts and Sciences cover letter
(Letter from the College to OAA. Owner: Andereck, Claude David)

Comments

- Attachment fulfills several roles. *(by Shapiro, Daniel B on 03/17/2011 08:31 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Shapiro, Daniel B	01/14/2011 08:27 PM	Submitted for Approval
Approved	Shapiro, Daniel B	01/14/2011 08:38 PM	Unit Approval
Revision Requested	Andereck, Claude David	01/19/2011 03:11 PM	College Approval
Submitted	Shapiro, Daniel B	03/17/2011 08:31 PM	Submitted for Approval
Approved	Shapiro, Daniel B	03/17/2011 10:22 PM	Unit Approval
Approved	Andereck, Claude David	03/22/2011 03:34 PM	College Approval
Pending Approval	Hanlin, Deborah Kay Vankeerbergen, Bernadette Chantal Meyers, Catherine Anne Jenkins, Mary Ellen Bigler Nolen, Dawn	03/22/2011 03:34 PM	ASCCAO Approval

186 University Hall
230 North Oval Mall
Columbus, OH 43210

Phone (614) 292-8908
Fax (614) 247-7498

March 22, 2011

Larry Krissek
Chair, Arts and Sciences CCI

Dear Larry:

It is a pleasure to forward to you the proposals for the BS and BA major programs in Mathematics under semesters. The only difference between the two programs lies in the GE component. The programs have been converted with only minor changes from their quarter versions in terms of requirements. In addition, in an attempt to increase success rates in course sequences, they have expanded the requirement that a student receive a grade of C- or better in prerequisite courses in introductory calculus to sequences at higher levels, a common practice at other institutions.

Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on January 19, 2011. Feedback from these discussions has been incorporated in the proposal.

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

Sincerely,



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

Rationale for semester plans: BS in Math

Tracks (sub-plans) within the mathematics major.

The Department of Mathematics currently offers a BS in Mathematics, with six tracks within that major. With the conversion to semesters we will eliminate the *Applied Discrete Math* track, because of low enrollments. The remaining five tracks are

- Theoretical Mathematics
- Education Mathematics
- Bio-Mathematics
- Applied Mathematics
- Financial Mathematics

These will be implemented as sub-plans within the mathematics major.

Transcript.

The Department requests that the name of the sub-plan appear explicitly on each student's transcript.

Changes in credit hours.

This chart displays the numbers of credit hours required in the different tracks (sub-plans).

Track	Quarter hrs	(2/3)*Quarter	Semester hrs	Δ
Theoretical	53 – 55 5 out & 48 in 10 out & 45 in	35.3 – 36.7	38 – 39 4 out & 34 in 8 out & 31 in	+ 2.7
Education	53 – 55 5 out & 48 in 10 out & 45 in	35.3 – 36.7	39 – 40 4 out & 34 in 8 out & 31 in	+ 3.3 to + 3.7
Bio-Math	56 – 60 19 out & 37 in 26 out & 34 in	38.0 – 40.0	39 – 41 4 out & 35 in 15 out & 26 in	+ 3 to + 2.0
Applied	58 – 60 14 out & 44 in 19 out & 41 in	38.7 – 40.0	41 – 42 10 out & 31 in 14 out & 28 in	+ 2.3 to + 2.0
Financial	57 – 59 14 out & 43 in 19 out & 40 in	38.0 – 39.3	41 – 42 10 out & 21 in 14 out & 28 in	+ 3 to + 2.7

Honors.

Honors versions of courses are not mentioned explicitly within this documentation of the math major tracks.

The Department of Mathematics has an active honors program, allowing strong undergraduate students to take four full years of honors math courses. To be an honors math major (in any track), a student must pass two sequences of honors math courses, replacing the corresponding non-honors courses required for that track. The first honors course sequence must be either 161.01H - 162.01H - 263.01H or 190H - 191H - 264H. In the semester system, those course sequences will be 1181H - 2182H or 4190H - 4191H.

Grade Prerequisites.

Academically weak students sometimes encounter serious difficulties in math course sequences, because success in each course requires mastery of the central ideas taught in the preceding course. To improve success rates in those courses, we will implement the “C-minus Rule”:

A student may enter a given math course only with the grade of C- or better in the prerequisite math course.

This rule has been in place for several years for the transitions from 150 to 151, from 151 to 152, and from 152 to 153. We will impose this rule on all the mainstream undergraduate math courses once the semester system is underway. Similar rules are standard practice at many colleges and universities in Ohio and in other states.

Changes in individual math course credits.

The Department of Mathematics embraces the idea that most upper division semester courses should be **3 credits**, running MWF for the whole semester.

Course sequences running for three quarters naturally transform into two-semester sequences. Individual 5-credit quarter courses typically become 3-credit semester courses. But in some cases the semester version of a course involves an increase in credit hours. Math major tracks that require several of those courses end up with fairly large increases in credit hours. Here is a list of the math courses in question, along with credit hours, quarter \rightarrow semester.

254 \rightarrow 2153	calculus 3	5 \rightarrow 4
350 \rightarrow 3350	intro to math biology	3 \rightarrow 3
556 \rightarrow 4556	dynamical systems	3 \rightarrow 3
530 \rightarrow 3530	probability	3 \rightarrow 3
589 \rightarrow 3589	intro to financial math	3 \rightarrow 3
512 (557) \rightarrow 4512	partial differential eqs	3 \rightarrow 3
513 (551) \rightarrow 4551	vector analysis	3 \rightarrow 3
514 (552) \rightarrow 4552	complex analysis	3 \rightarrow 3
568 (571 – 572) \rightarrow 2568	linear algebra	3 \rightarrow 3
578 \rightarrow 4578	discrete math models	5 \rightarrow 4
647 \rightarrow 5001	set theory	3 \rightarrow 3

Here are short explanations for those course transitions.

254: The sequence 1151 – 1152 – 2153 of standard calculus courses has topics specified by the Ohio Transfer Assurance Guides (TAGs), as posted at

<http://regents.ohio.gov/transfer/otm/otm-learning-outcomes.php>.

The semester credits 5, 5, 4 are in line with recommendations from the Board of Regents.

350 and 556: These courses are part of the newly developed bio-mathematics curriculum. Course developers are using the semester conversion as an opportunity to expand those courses to include more topics useful for students studying mathematical biology.

530: This probability course is sometimes used as an alternative to Stat 420 even though there are some differences in content. The expanded course 3530 will include all the probability needed for math and actuarial science majors, and is aligned closely enough with statistics courses that it can act as a prerequisite for Stat 4202. This increase in content has been recommended by leaders of both the financial math track and the actuarial science major.

589: Actuarial science majors form the primary audience for this course. Its expansion provides better alignment of the material with the professional exams for actuaries.

512, 513, and 514 are 3-credit courses taken mostly by engineering students. Corresponding 5-credit courses (557, 551, and 552) are taken primarily by math and science majors and some graduate students in engineering. With semester conversion, we will reduce the number of courses by combining each of these pairs into a single 3-credit semester course.

568 is a 3-credit linear algebra course very crowded with topics. For decades, client engineering departments have insisted on a 3-credit course (in quarters), rather than the more natural 5-credit course needed to explain the ideas appropriately. With semesters, that pressure will decrease because engineering students will have the option of Math 2174: half linear algebra and half differential equations. The course sequence 571-572 will also convert to Math 2568.

578 is a 5-credit course with a computer science course prerequisite. Students work on mathematical projects using whatever computer languages they already know. People re-designing this course decided to provide a more uniform experience by requiring students to use a standard linear algebra software package. After a couple of weeks in class learning about MATLAB, students with minimal programming experience will be able to use that software in their projects.

Inclusion of that training in that software helps justify the use of 4 semester credits rather than 3. That increase of credits is balanced by the omission of a CSE course prerequisite. A copy of a concurrence email message from CSE is included at the end of this Rationale.

COMMENTS on changes in the tracks (sub-plans).

Theoretical track.

Currently the requirement of Math 530 or Stat 420 is hidden, since the required course Stat 421 has one of those two courses as a prerequisite. With semester conversion, we will list an explicit requirement: Math 5530 or Stat 4201. This decision increases the official hours within the major. The increase in core requirements is mitigated by a small decrease in elective hours.

Education track.

This option is a fairly small alteration of the theoretical track: Differential Equations is not required, but three elective courses in the theoretical track are required here because of their importance for high school teaching: geometry, discrete modeling, and history of mathematics.

Applied track.

Added credits from various individual course conversions are balanced by moving a few courses from required to elective, and adjusting the total number of elective hours.

Biology track.

Courses in the quarter system were converted directly to corresponding courses in the semester system, leading to a slight increase in credit hours.

Financial track.

This track involves the largest total increase in individual course credits: each of the required courses Math 512, 530, 568, 589, and Stat 420, 421 increases the count by one credit. The current 57 to 59 quarter credits, correspond to 38 to 39.3 semester credits, but a direct conversion leads to 44 to 45 semester credits. This impact has been lessened by removing Math 3588 (Practicum in Actuarial Science) from the required list. Changes in content in this Practicum make it more closely aligned with the Actuarial program, and less suitable for students in the Financial Math track. As enrollments in the Financial track grow we hope to create one or two new courses designed for that audience. We will be able move forward with that plan after we hire a faculty member who specializes in financial mathematics.

Detailed plans for the conversion.

The four appendices below contain more detailed plans for each of the five tracks in both quarter and semester format.

Appendix A:

Major Program Forms for each track, in both the quarter and semester systems.

Appendix B:

A *Curriculum Map* for each track. That map lists the quarter and semester courses in each track of the major, and indicates which Program Learning Goals are emphasized in each semester course.

Appendix C:

Sample *Four-Year Plans* for each track are provided, for both quarters and semesters.

Appendix D:

Transition Policies for math majors. In most cases the transition involves straightforward, one-for-one substitutions of courses and course sequences. Two upper division course sequences (Math 547-548-549 and 580-581-582) require special transition courses in Au12. Plans for transition of the mainstream calculus courses are outlined in Appendix D as well.

Transition plans for all math service courses at OSU appears in a separate document, posted at the semester conversion web page

<http://www.math.ohio-state.edu/semesters>.

Math 4578 Concurrence from CSE

From: Neelam Soundarajan [neelam@cse.ohio-state.edu]
Sent: Thursday, January 27, 2011 10:32 AM
To: Shapiro, Daniel
Cc: neelam@cse.ohio-state.edu; supowit@cse.ohio-state.edu
Subject: RE: Math 578

Dear Dan,

I talked to a couple of people in our dept. and the consensus was that although we do plan to offer a 2-cr MATLAB course that would be appropriate for students interested in developing skills in MATLAB programming, given that you require only minimal familiarity with MATLAB, we concur with your proposed plans for MATH 4578, including two MATLAB training sessions.

Best wishes,

--Neelam.

=====
Neelam Soundarajan
Acting Assoc. Chair
CSE Dept.
=====

On Tuesday, January 25, 2011, at 1:47 PM, Shapiro, Daniel writes:

Dear Neelam,

I'm writing again about the semester conversion of Math 578. As mentioned in messages sent in early December, we plan to run Math 4578, "Discrete Mathematical Models", with a format somewhat different from the current Math 578. The semester course will not have any formal prerequisite of a CSE course. Instead, it will include enough MATLAB training so that students can complete simple projects using that software.

To facility the approval process for this course, it would be convenient to include a "concurrence" from CSE. That concurrence can be given in an email message to me.

Sincerely,
Dan S.

Daniel Shapiro
Professor and Vice Chair
Department of Mathematics - OSU

MAJOR PROGRAM FORM (QUARTERS)

Colleges of the Arts and Science

			Mathematics Major – Theoretical Track
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Name: last	first	middle	Major

Local Address:	Degree Sought: BA BS

City, State:	Zip	e-mail address

Phone: residence	business	Expected Date of Graduation: quarter/yr
Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		<input checked="" type="checkbox"/> X
yes no		

If completing two majors, list both below and file a separate form for each one:

--	--

Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 151	5		Math 153	5	
Math 152	5				

Part B: Major Program (Minimum grade of “C-”, and minimum grade average of “C” (2.00) required.)
Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 254	5		Math 345	4	
Math 568 or 571	3		Stat 421	5	

Required Courses for Traditional Track:

Math 255	5		Math 530 or Stat 420	3 or 5	
Math 547	3		Math 580	3	
Math 548	3		Math 581	3	
Math 549	3		Math 582	3	
Electives (10 credit hours) chosen from a list of math courses. See Curriculum Map for details.					

53 or 55

Total of Part B only

Check whether this is:	x	
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See back for information about major programs. original revision
Distribution: One copy each - Faculty adviser, Student, College Office, 130 Denney Hall

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Signature of faculty adviser

Name of adviser (please print)	
Mathematics	292-

Department	Campus phone
	Date:

MAJOR PROGRAM FORM (SEMESTERS)

Colleges of the Arts and Science

			Mathematics Major – Theoretical Track
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Name: last	first	middle	Major

Local Address:	Degree Sought: BA BS

City, State:	Zip	e-mail address

Phone: residence	business	Expected Date of Graduation: semester/year
Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		<input checked="" type="checkbox"/> X

yes no

If completing two majors, list both below and file a separate form for each one:

--	--

Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151	5		Math 1152	5	

**Part B: Major Program (Minimum grade of “C-”, and minimum grade average of “C” (2.00) required.)
Core Requirements (Substitutions are rarely permitted)**

Courses	Hours	Grade	Courses	Hours	Grade
Math 2153	4		Math 3345	3	
Math 2568	3		Stat 4202	4	

Required Courses for Traditional Track:

Math 2255	3		Math 4530 or Stat 4201	3 or 4	
Math 4547	3		Math 4580	3	
Math 4548	3		Math 4581	3	
Electives (6 credit hours) chosen from a list of math courses. See Curriculum Map for details.					

38 or 39

Total of Part B only

Check whether this is:	x	
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See back for information about major programs. original revision
Distribution: One copy each - Faculty adviser, Student, College Office, 130 Denney Hall

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Signature of faculty adviser

Name of adviser (please print)	
Mathematics	292-

Department	Campus phone
Date:	

MAJOR PROGRAM FORM (QUARTERS)

Colleges of the Arts and Science

			Mathematics Major: Education Track
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Name: last first middle Major

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Local Address: Degree Sought: BA BS

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City, State: Zip e-mail address

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Phone: residence business Expected Date of Graduation: quarter/yr

Have you filed a degree application in the college office? yes no

(NOTE: This form is NOT a degree application)

If completing two majors, list both below and file a separate form for each one:

--	--

Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 151	5		Math 153	5	
Math 152	5				

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)
 Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 254*	5		Math 345*	4	
Math 568* or 571*	3		Stat 421*	5	

Required Courses for Educational Track:

Math 547	3		Math 580*	3	
Math 548	3		Math 581*	3	
Math 549	3		Math 582	3	
Math 530 or Stat 420	3 or 5		Math 507*	5	
Math 504*	5		Math 578*	5	
* needed for OSU MEd program					

53 or 55

Total of Part B only

Check whether this is: original revision

See back for information about major programs.
 Distribution: One copy each - Faculty adviser, Student, College Office, 130 Denney Hall

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Signature of faculty adviser

--

Name of adviser (please print)

--	--

Department: **Mathematics** Campus phone: **292-**

Date:

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MAJOR PROGRAM FORM (SEMESTERS)

Colleges of the Arts and Science

			Mathematics Major: Education Track
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Name: last first middle Major

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Local Address: Degree Sought: BA BS

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City, State: Zip e-mail address

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Phone: residence business Expected Date of Graduation: semester/year

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Have you filed a degree application in the college office?
(NOTE: This form is NOT a degree application)

		X	
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yes no

If completing two majors, list both below and file a separate form for each one:

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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151	5		Math 1152	5	

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)
Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 2153*	4		Math 3345*	3	
Math 2568*	3		Math 4530 or Stat 4201*	3 or 4	
			Stat 4202*	4	

Required Courses for Education Track:

Math 4547	3		Math 4580*	3	
Math 4548	3		Math 4581*	3	
Math 4504*	3		Math 4507*	3	
			Math 4578*	4	
* needed for OSU MEd program					

39 or 40

Total of Part B only

Check whether this is:	X	
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See back for information about major programs. original revision
Distribution: One copy each - Faculty adviser, Student, College Office, 130 Denney Hall

Signature of faculty adviser	
Name of adviser (please print)	
Mathematics	292-
Department	Campus phone
	Date:

MAJOR PROGRAM FORM (QUARTERS)

Colleges of the Arts and Science

			Mathematics Major: Bio-Math Track
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Name: last	first	middle	Major
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Local Address:	Degree Sought: BA BS
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City, State:	Zip	e-mail address
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Phone: residence	business	Expected Date of Graduation: quarter/yr
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Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		X		
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yes no

If completing two majors, list both below and file a separate form for each one:

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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 151	5		Chem 121	5	
Math 152	5		Bio 113	5	
Math 153	5		Bio 114	5	

**Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)
Core Requirements (Substitutions are rarely permitted)**

Courses	Hours	Grade	Courses	Hours	Grade
Math 254	5				
Math 345	4		Math 530 or Stat 420	3 or 5	
Math 571	3		Stat 421	5	
Math 572	3				

Required Courses for Bio-Mathematics Track

Math 255	5		Math 350	3	
			Bio 401 - 402 or MG 660 - 661	5, 5	
Two of the following three:					
Math 512, 556, 607	3, 3, 5		Electives (9 credit hours) chosen from a list of math & science courses. See Curriculum Map for details.		

56 - 60

Total of Part B only

Check whether this is:	X			
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See back for information about major programs. original revision
Distribution: One copy each - Faculty adviser, Student, College Office, 130 Denney Hall

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Signature of faculty adviser

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Name of adviser (please print)

Mathematics	292-
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Department Campus phone

Date:	
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MAJOR PROGRAM FORM (SEMESTERS)

Colleges of the Arts and Science

			Mathematics Major: Bio-Math Track
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Name: last first middle Major

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Local Address: Degree Sought: BA BS

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City, State: Zip e-mail address

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Phone: residence business Expected Date of Graduation: semester/year

Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		X
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yes no

If completing two majors, list both below and file a separate form for each one:

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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151	5		Chem 1210	5	
Math 1152	5		Bio 1113	4	
			Bio 1114	4	

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)
Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 2153	4		Math 3345	3	
Math 2568	3		Math 4530 or Stat 4201	3 or 4	
			Stat 4202	4	

Required Courses for Bio-Math Track:

Math 3350	3		Math 2255	3	
			Bio 2401 or MG 5560	4 or 5	
Two of the following three:					
Math 3607, 4557, 4556	3, 3, 3		Electives (6 credits) chosen from a list of math & science courses. See Curriculum Map for details.	6	

39 - 41

Total of Part B only

Check whether this is:	X	
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See back for information about major programs. original revision
Distribution: One copy each - Faculty adviser, Student, College Office, 130 Denney Hall

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Signature of faculty adviser

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Name of adviser (please print)

Mathematics	292-
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Department Campus phone

	Date:
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MAJOR PROGRAM FORM (QUARTERS)

Colleges of the Arts and Science

			Mathematics Major: Applied Track - Chemistry Option
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Name: last first middle Major

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Local Address: Degree Sought: BA BS

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City, State: Zip e-mail address

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Phone: residence business Expected Date of Graduation: quarter/yr

Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		X
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yes no

If completing two majors, list both below and file a separate form for each one:

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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 151	5		Physics 131	5	
Math 152	5		Physics 132	5	
Math 153	5		Physics 133	5	
Chem 121	5		Chem 123	5	
Chem 122	5		CSE 202 or equivalent	4	

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)

Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 254	5		Math 345	4	
Math 571	3		Stat 421	5	

Required Courses for Applied Math Track:

Group I Electives: Math courses 9 hours from:

Math 255 or 415	5 or 4		Math 547, 548, 549	3, 3, 3	
Math 512	3		Math 601, 602, 603.02	3, 3, 3	
Math 514	3		Math 665, 666	4, 4	
Math 572	3		Math 701	5	
Math 530 or Stat 420	3 or 5		Math 513 or 551	3 or 5	
Math 607	5				

Group II Electives: Chemistry. 9 hrs from:

Chem 221	5		Chem 530-531-532	3, 3, 3	
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56 to 59

Total of Part B only

Check whether this is:	X	
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Signature of faculty adviser

Name of adviser (please print)
Mathematics

	292-
Department	Campus phone

	Date:
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MAJOR PROGRAM FORM (SEMESTERS)

Colleges of the Arts and Science

			Mathematics Major: Applied Track - Chemistry Option
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Name: last	first	middle	Major

Local Address:	Degree Sought: BA BS

City, State:	Zip	e-mail address

Phone: residence	business	Expected Date of Graduation: semester/year
Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		X

yes no

If completing two majors, list both below and file a separate form for each one:

--	--

Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151	5		Physics 1131	5	
Math 1152	5		Physics 1132	5	
Chem 1210	5		CSE 1222 or equivalent	3	
Chem 1220	5				

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)

Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 2153	4		Math 3345	3	
Math 2568	3		Stat 4202	4	

Required Courses for Applied Math Track:

Group I Electives: Math. 6 hours from:

Math 2255	3		Math 4547, 4548	3, 3	
Math 3607	3		Math 5101, 5102	3, 3	
Math 4530 or Stat 4201	3 or 4		Math 5756, 5757	3, 3	
Math 4552	3		Math 5451	3	
Math 4512	3		Math 4551	3	
Group II Electives: 6 credit hours					
Chosen from a list. See Curriculum Map for further details.					

41 - 42

Total of Part B only

Check whether this is:	x	
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See back for information about major programs.

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Signature of faculty adviser

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Name of adviser (please print)

Mathematics	292-
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Department

Campus phone

	Date:
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MAJOR PROGRAM FORM (QUARTERS)

Colleges of the Arts and Science

			Mathematics Major: Applied Track - Physics Option
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Name: last	first	middle	Major
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Local Address:	Degree Sought:	BA	BS
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City, State:	Zip	e-mail address
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Phone: residence	business	Expected Date of Graduation: quarter/yr
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Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		X
-------------------------------------------------------------------------------------------------------------	--	---

If completing two majors, list both below and file a separate form for each one:	
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Mathematics Major: Applied Track - Physics Option	Physics
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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 151	5		Physics 131	5	
Math 152	5		Physics 132	5	
Math 153	5		Physics 133	5	
			CSE 202	4	

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)
Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 254	5		Math 345	4	
Math 571	3		Stat 421	5	

Required Courses for Applied Math Track:	Hours	Grade	Group I Electives: Math courses 9 hours from:	Hours	Grade
Math 255 or 415	5 or 4		Math 547, 548, 549	3, 3, 3	
Math 512	3		Math 601, 602, 603.02	3, 3, 3	
Math 514	3		Math 665, 666	4, 4	
Math 572	3		Math 701	5	
Math 530 or Stat 420	3 or 5		Math 513 or 551	3 or 5	
Math 607	5				
Group II Electives: Physics. 12 hrs from:					
Phys 261, 262, 263	4, 4, 4				
various 600-level courses					

59 - 64

Total of Part B only

Check whether this is:	x	
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Signature of faculty adviser	
Name of adviser (please print)	
Mathematics	292-
Department	Campus phone
	Date:

MAJOR PROGRAM FORM (SEMESTERS)

Colleges of the Arts and Science

			Mathematics Major: Applied Track - Physics Option
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Name: last first middle Major

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Local Address: Degree Sought: BA BS

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City, State: Zip e-mail address

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Phone: residence business Expected Date of Graduation: semester/year

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Have you filed a degree application in the college office?
(NOTE: This form is NOT a degree application)

		X
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If completing two majors, list both below and file a separate form for each one:

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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151	5		Physics 1250	5	
Math 1152	5		Physics 1251	5	
			CSE 1222 or equivalent	3	

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)
Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 2153	4		Math 3345	3	
Math 4530 or Stat 4201	3 or 4		Stat 4202	4	
Math 2568	3				

Required Courses for Applied Math Track:

Math 2255	3		Math 4557	3	
Math 3607	3		Math 4552	3	

Group I Electives, Math. 6 hours from:

Math 4547, 4548	3, 3		Math 5756, 5757	3, 3	
Math 5101, 5102	3, 3		Math 5451	3	

Group II Electives, Physics. 8 hrs from:

Physics 2300, 2301	4, 4				
various 5000-level courses					

43 - 44

Total of Part B only

Check whether this is:

	x	
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Signature of faculty adviser	
Name of adviser (please print)	
Mathematics	292-
Department	Campus phone
	Date:

MAJOR PROGRAM FORM (QUARTERS)

Colleges of the Arts and Science

			Mathematics Major - Financial Track
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Name: last	first	middle	Major
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Local Address:		Degree Sought: BA	BS
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City, State:	Zip	e-mail address
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Phone: residence	business	Expected Date of Graduation: quarter/yr				
Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"></td> <td style="width:50%; text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">yes</td> <td style="text-align: center;">no</td> </tr> </table>		X	yes	no
	X					
yes	no					

If completing two majors, list both below and file a separate form for each one:

--	--

Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 151	5		Econ 200	5	
Math 152	5		Econ 201	5	
Math 153	5		Acct 310	5	
			CS&E 200	5	

Part B: Major Program (Minimum grade of "C-", and minimum grade average of "C" (2.00) required.)

Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 254	5		Math 345	4	
Math 568 or 571	3		Stat 421	5	

Required Courses for Financial Track

Math 255	5		Math 618	4	
Math 512	3		Math 632	4	
Math 530 or Stat 420	3, 5		CSE 201 or 202	5	
Math 589	3		Bus Fin 420 or 620	4	
Math 607	5		Math 588	4	

57 - 59

Total of Part B only

Check whether this is:	x	
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Signature of faculty adviser

Name of adviser (please print)

Mathematics	
Department	Campus phone

	Date:
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MAJOR PROGRAM FORM (SEMESTERS)

Colleges of the Arts and Science

			Mathematics Major – Financial Track
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Name: last	first	middle	Major
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Local Address:	Degree Sought:	BA	BS
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City, State:	Zip	e-mail address
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Phone: residence	business	Expected Date of Graduation: semester/year
Have you filed a degree application in the college office? (NOTE: This form is NOT a degree application)		X

yes no

If completing two majors, list both below and file a separate form for each one:

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Part A: Required Prerequisites (and / or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151	5		Math 1152	5	
Acct 2000	3		CSE 1113	4	
Econ 2001.01	3		Econ 2002.01	3	

Part B: Major Program (Minimum grade of “C-”, and minimum grade average of “C” (2.00) required.)
 Core Requirements (Substitutions are rarely permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Math 2153	4		Math 3589	3	
Math 2255	3		Math 3607	3	
Math 2568	3		Math 3618	3	
Math 3345	3		Math 4512	3	
Math 5632	3		Math 4530 or Stat 4201	3 or 4	
Bus Fin 2220 or 3280	3 or 3		Stat 4202	4	
CSE 1222 or 1223	3 or 3				

41 - 42

Total of Part B only

Check whether this is:	x	
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Signature of faculty adviser
Name of adviser (please print)
Mathematics
Department
Campus phone
Date:

Math Major, Theoretical Track 53 - 55 quarter hrs become 38 - 39 semester credit hrs.								
Segment of major program	Quarter course #	Quarter course name	Credit hours	Semester course #	Semester course name	Units	Learning outcome	Nature of conversion
Prerequisites (15 quarter credit hours become 10 semester credit hours; some may double-count in GEC)								
	Math 151	Calculus and Analytic Geometry I	5	Math 1151	Calculus 1	5	1, 2, 3	replaces 151-152-153
	Math 152	Calculus and Analytic Geometry II	5	Math 1152	Calculus 2	5	1, 2, 3	
	Math 153	Calculus and Analytic Geometry III	5					
Core major requirements (20 to 22 quarter credit hours become 17 to 18 semester credit hours)								
	Math 254	Calculus and Analytic Geometry IV	5	Math 2153	Calculus 3	4	1*, 2*, 3	expands on 254
	Math 345	Foundations of Higher Mathematics	4	Math 3345	Foundations of Higher Mathematics	3	1**, 2, 3*, 4*	expands on 345
	Math 568	Linear Algebra	3	Math 2568	Linear Algebra	3	1, 2, 3, 5	expands on 568 or 571
	Math 530 or Stat 420	Probability or Intro to Math Stat I	3 or 5	Math 4530 or Stat 4201	Probability or Intro to Math Stat I	3 or 4	1*, 2, 3*, 4*, 5*	Math 4530 expands on 530 Stat 4201 expands on Stat 420
	Stat 421	Intro to Math Stat II	5	Stat 4202	Intro to Math Stat II	4	1, 3, 5	Stat 4202 expands on Stat 421
Required courses in track (23 quarter credit hours become 15 semester credit hours)								
	Math 255	Differential Equations and Their Applications	5	Math 2255	Differential Equations and Their Applications	3	1, 2*, 3*, 4	replaces 255
	Math 547	Introductory Analysis I	3	Math 4547	Introductory Analysis 1	3	1**, 2**, 3*, 4**, 5	Math 4547-4548 replaces 547-548-549
	Math 548	Introductory Analysis II	3	Math 4548	Introductory Analysis 2	3	1**, 2**, 3*, 4**, 5	
	Math 549	Introductory Analysis III	3					
	Math 580	Algebra I	3	Math 4580	Abstract Algebra 1	3	1**, 2**, 3*, 4**, 5	Math 4580-4581 replaces 580-581-582
	Math 581	Algebra II	3	Math 4581	Abstract Algebra 2	3	1**, 2**, 3*, 4**, 5	
	Math 582	Algebra III	3					
Electives (10 quarter credit hours become 6 semester credit hours)								
	Math 504	History of Mathematics	5	Math 4504	History of Mathematics	3	1**, 2*, 3*, 4**, 5**	replaces 504
	Math 507	Advanced Geometry	5	Math 4507	Geometry	3	1**, 2*, 3*, 4**, 5**	replaces 507
	Math 512	Partial Differential Equations and Boundary Value Problems	3	Math 4557	Partial Differential Equations and Boundary Value Problems	3	1*, 3*, 4*, 5*	replaces 557; expands on 512
	Math 513 or Math 551	Vector Analysis	3 or 5	Math 4551	Vector Analysis	3	1*, 2*, 3*, 4*, 5*	replaces 551; expands on 513
	Math 514 or Math 552	Complex Variables	3 or 5	Math 4552	Complex Analysis	3	1*, 2*, 3*, 4*, 5*	replaces 552; expands on 514
	Math 573	Elementary Number Theory	5	Math 4573	Elementary Number Theory	3	1**, 2*, 3*, 4*, 5*	replaces 573
	Math 575	Combinatorial Mathematics and Graph Theory	5	Math 4575	Combinatorial Mathematics and Graph Theory	3	1*, 2*, 3*, 4*, 5*	replaces 575
	Math 578	Discrete Mathematical Models	5	Math 4578	Discrete Mathematical Models	4	1*, 2*, 3*, 4*, 5**	expands on 578
Major program learning outcomes								
	1	Learn conceptual frameworks needed to study higher mathematics, including an introduction to mathematical reasoning, and an understanding of how to read and write proofs.						
	2	Acquire basic mastery of core areas of mathematics, including calculus, analysis and algebra.						
	3	Develop powerful mathematical problem solving skills.						
	4	Learn to communicate mathematical understanding effectively.						
	5	Become proficient in chosen tracks within the major.						
* Learning outcomes are indicated for each semester course listed. Number of asterisks indicates level: beginning, intermediate, or advanced.								

Math Major, Education Track 53 - 55 quarter hrs. become 39 - 40 semester credit hrs.								
Segment of major program	Quarter course #	Quarter course name	Credit hours	Semester course #	Semester course name	Units	Learning outcome	Nature of conversion
Prerequisites (15 quarter credit hours become 10 semester credit hours; some may double-count in GEC)								
	Math 151	Calculus and Analytic Geometry I	5	Math 1151	Calculus 1	5	1, 2, 3	1151-1152 replaces
	Math 152	Calculus and Analytic Geometry II	5	Math 1152	Calculus 2	5	1, 2, 3	151-152-153
	Math 153	Calculus and Analytic Geometry III	5					
	CSE 201, 202, or 221	Computer Problem Solving for Business, Elem Computer Programming Software Dev. Using Cmpnts	4 4 4	CS&E 1223, 1222, or 2221	Intro Computer Prog in Java Intro Computer Prog in C++ Software I	3 3 4	3, 4	1223, 1222, 2221 replace 201, 202, 221
Core major requirements (20 to 22 quarter credit hours become 17 to 18 semester credit hours)								
	Math 254*	Calculus and Analytic Geometry IV	5	Math 2153*	Calculus 3	4	1*, 2*, 3	expands on 254
	Math 345* Math 368* or	Foundations of Higher Mathematics Linear Algebra or	4 3	Math 3345* Math 2568*	Foundations of Higher Mathematics Linear Algebra	3 3	1**, 2**, 3*, 4*, 5* 1, 2, 3, 5	expands on 345 expands on 568/571
	Math 571* Math 530 or Stat 420 Stat 421*	Linear Algebra for Applications I Probability or Intro to Math Stat I Intro to Math Stat II	3 or 5 5	Math 4530 or Stat 4201 Stat 4202*	Probability or Intro to Math Stat I Intro to Math Stat II	3 or 4 4	1**, 2, 3*, 4*, 5* 1, 3, 5*	Stat 4201 expands on Stat 420 Stat 4202 expands on Stat 421
Required courses in track (33 quarter credit hours become 22 semester credit hours)								
	Math 547	Introductory Analysis I	3	Math 4547	Introductory Analysis 1	3	1**, 2**, 3*, 4**, 5	4547-4548 replaces 547-548-549
	Math 548	Introductory Analysis II	3	Math 4548	Introductory Analysis 2	3	1**, 2**, 3*, 4**, 5	
	Math 549	Introductory Analysis III	3					
	Math 580*	Algebra I	3	Math 4580*	Abstract Algebra 1	3	1**, 2**, 3*, 4**, 5*	4580-4581 replaces 580-581-582
	Math 581*	Algebra II	3	Math 4581*	Abstract Algebra 2	3	1**, 2**, 3*, 4**, 5*	
	Math 582	Algebra III	3					
	Math 504*	History of Mathematics	5	Math 4504*	History of Mathematics	3	1**, 2**, 3*, 4**, 5	replaces 504
	Math 507*	Advanced Geometry	5	Math 4507*	Geometry	3	1**, 2**, 3*, 4**, 5**	replaces 507
	Math 578*	Discrete Mathematical Models	5	Math 4578*	Discrete Mathematical Models	4	1**, 2, 3**, 4**, 5*	expands on 578
Courses marked with * are needed for the MEd program at OSU.								
Major program learning outcomes								
	1	Learn conceptual frameworks needed to study higher mathematics, including an introduction to mathematical reasoning, and an understanding of how to read and write proofs.						
	2	Acquire basic mastery of core areas of mathematics, including calculus, analysis and algebra.						
	3	Develop powerful mathematical problem solving skills.						
	4	Learn to communicate mathematical understanding effectively.						
	5	Become proficient in chosen tracks within the major.						
* Learning outcomes are indicated for each semester course listed. Number of asterisks indicates level: beginning, intermediate, or advanced.								

Math Major, Biology Track 56 - 60 quarter hrs become 39 - 41 semester hrs.								
Segment of major program	Quarter course #	Quarter course name	Credit hours	Semester course #	Semester course name	Units	Learning outcome	Nature of conversion
Prerequisites (30 quarter credit hours become 23 semester credit hours; some may double-count in GEC)								
	Math 151	Calculus and Analytic Geometry I	5	Math 1151	Calculus 1	5	1, 2, 3	1151-1152 replaces 151-152-153
	Math 152	Calculus and Analytic Geometry II	5	Math 1152	Calculus 2	5	1, 2, 3	
	Math 153	Calculus and Analytic Geometry III	5					
	Bio 113	BioSci: Energy Transfer and Development	5	Bio 1113	BioSci: Energy Transfer and Development	4	5	Bio 1113-1114 Replaces Bio 113-114
	Bio 114	BioSci: Form, Function, Diversity, and Ecology	5	Bio 1114	BioSci: Form, Function, Diversity, and Ecology	4	5	
	Chem 121	General Chemistry	5	Chem 1210	General Chemistry	5	5	Chem 1210 replaces Chem 121
Core major requirements (23-25 quarter credit hours become 17-18 semester credit hours)								
	Math 254	Calculus and Analytic Geometry IV	5	Math 2153	Calculus 3	4	1*, 2**, 3	expands on 254
	Math 345	Foundations of Higher Math	4	Math 3345	Foundations of Higher Math	3	1**, 2**, 3*, 4*	expands on 345
	Math 571-2	Linear Alg for Appl I, II	3, 3	Math 2568	Linear algebra	3	1*, 2*, 3*, 5	replaces 571-571, expands on 568
	Math 530 or Stat 420 or Stat 421	Probability or Intro to Math Stat I	3 or 5	Math 4530 or Stat 4201 or Stat 4202	Probability or Intro to Math Stat I	3 or 4	1**, 2, 3*, 4*, 5*	4530 expands on 530; Stat 4201 replaces Stat 420
		Intro to Math Stat II	5		Intro to Math Stat II	4	1, 5	Stat 4202 replaces Stat 421
Required courses in track (33 to 35 quarter credit hours become 24 semester credit hours)								
	Math 350	Intro to Mathematical Biology	3	Math 3350	Intro to Mathematical Biology	3	4*, 5	replaces 350
	Math 255	Diff Equations and Appls	5	Math 2255	Differential Equations and Appls	3	1*, 2**, 3*, 4*	replaces 255
	Bio 401 - 2 or MG 660 - 1	Integrated Biology I, II, or Integrated Mol & Cell Bio I, II	5, 5	Bio 2401 or MG 5560	Integrated Mol & Cell Bio, or Integrated Biology	4, 5	5*	Bio 2401 replaces Bio 401-402
Two of the following three:				Two of the following three:				
	Math 512	Partial Differential Equations	3	Math 4557	Partial Differential Equations	3	1*, 2, 3**, 5**	4557 expands on 557
	Math 556	Dynamical Systems	3	Math 4556	Dynamical Systems	3	1*, 2, 3**, 5**	4556 expands on 556
	Math 607	Essentials of Numerical Analysis	5	Math 3607	Beginning Scientific Computing	3	1*, 2, 3*, 5**	3607 is the undergraduate version of 607
Electives (9 credit hrs) Must include courses within and outside of Math				Electives (6 units)				
	Math 547	Introductory Analysis I	3	Math 4547	Introductory Analysis 1	3	1**, 2**, 3*, 4**	Math 4547-4548 replaces Math 547-548-549
	Math 580	Algebra I	3	Math 4580	Abstract Algebra 1	3	1**, 2**, 3*, 4**	Math 4580-4581 replaces Math 580-581-582
	Math 514	Complex Variables	3	Math 4552	Complex Analysis	3	1*, 2**, 3**, 4*, 5*	replaces 514 or 552
	Math 540H	Calculus on Manifolds	5	Math 5540H	Honors Differential Geometry	5	1**, 2**, 3**, 4*, 5*	replaces 540H-541H
	Math 513 or 551	Vector Analysis	3 or 5	Math 4551	Vector Analysis	3	1*, 3**, 4*, 5*	replaces 513 & 551
	Math 601, 602, or 603.02	Math Principles in Science I, II, III	3, 3, 3	Math 5101-5102	Linear Math in Finite & Infinite Dimensions	3, 3	1*, 2*, 3** 4**, 5*	5101-5102 replace 601-602- 603.02
	Bchem 511	Intro to Biological Chemistry	5	Bchem 4511	Intro to Biological Chemistry	4	5**	Bchem 4511 replaces Bchem 511
	EEOB 400	Evolution	5	EEOB 3310	Evolution	4	5**	EEOB 3310 replaces EEOB 400
	EEOB 410	Animal form and function	4	EEOB 4520	Animal form and function	3	5**	EEOB 4520 replaces EEOB 410
	EEOB 503	Introductory Ecology (Lec + Lab)	6	EEOB 3420	Introductory Ecology	4	5**	EEOB 3420 replaces EEOB 503
	Chem 251	Organic chemistry	4	Chem 2510	Organic chemistry	4	5**	Chem 2510 replaces Chem 251
	MolGen 500	General genetics	5	MolGen 4500	General genetics	3	5**	MolGen 4500 replaces MolGen 509
	MolGen 601	Eukaryotic Mol Gen Lab	5	MolGen 5601	Eukaryotic Mol Gen Lab	4	5**	MolGen 5601 replaces MolGen 601
Major program learning outcomes								
	1	Learn conceptual frameworks needed to study higher mathematics, including an introduction to mathematical reasoning, and an understanding of how to read and write proofs.						
	2	Acquire basic mastery of core areas of mathematics, including calculus, analysis and algebra.						
	3	Develop powerful mathematical problem solving skills.						
	4	Learn to communicate mathematical understanding effectively.						
	5	Become proficient in chosen tracks within the major.						
* Learning outcomes are indicated for each semester course listed. Number of asterisks indicates level: beginning, intermediate, or advanced.								

Math Major, Applied Track (options Physics or Chemistry) 58 - 60 quarter hrs become 41 - 42 semester hrs.									
Segment of major program	Quarter course #	Quarter course name	Credit hours	Semester course #	Semester course name	Units	Learning outcome	Nature of conversion	
Prerequisites (34 quarter credit hours become 23 semester credit hours; some may double-count in GEC)									
	Math 151	Calculus and Analytic Geometry I	5	Math 1151	Calculus 1	5	1, 2, 3		
	Math 152	Calculus and Analytic Geometry II	5	Math 1152	Calculus 2	5	1, 2, 3	1151-1152 replaces 151-152-153	
	Math 153	Calculus and Analytic Geometry III	5						
Prerequisite courses like the following, depend on Applied Area:									
	Phys 131, 132, 133	Calc-based Physics 1, 2, 3	5, 5, 5	Phys 1250, 1251	Calc-based Physics 1, 2	5, 5	3, 5*	Phys 1250-1251 replaces Phys 131-132-133 CSE 1222 replaces 202.	
	CSE 202	Intro to Programming & Algorithms	4	CSE 1222	Intro to Programming in C++	3	3, 5*	C++ is the most appropriate option.	
	Bio 113, 114	Biological Sciences	5, 5	Bio 1113, 1114	Biological Sciences	4, 4	3, 5*	replace Bio 113, 114	
	Chem 121, 122, 123	General Chemistry	5, 5, 5	Chem 1210, 1220	General Chemistry	5, 5	3, 5*	replace Chem 121-122-123	
Core major requirements (23-25 quarter credit hours become 17-18 semester credit hours)									
	Math 254	Calculus and Analytic Geometry IV	5	Math 2153	Calculus 3	4	1*, 2*, 3	expands on 254	
	Math 345	Fdns of Higher Mathematics	4	Math 3345	Fdns of Higher Mathematics	3	1**, 2**, 3*, 4*	expands on 345	
	Math 571-2	Linear Algebra I, II	3, 3	Math 2568	Linear Algebra	3	1*, 2**, 3*, 4, 5	replaces 571-572	
	Math 530 or Stat 420	Probability, or Intro to Math Stat I	3 or 5	Math 4530 or Stat 4201	Probability or Intro to Math Stat I	3 or 4	1*, 2, 3**, 4*, 5*	expands on 530; Stat 4201 replaces Stat 420	
	Stat 421	Intro to Math Stat II	5	Stat 4202	Intro to Math Stat II	4	1, 3*, 5	Stat 4202 replaces Stat 421	
Required & Elective courses in track (34 quarter credit hours become 24 semester credit hours)									
Required:									
	Math 512	Partial Diff Equations	3	Math 4557	Partial Diff Eqs	3	1, 2**, 3*, 4, 5	replaces 557, expands on 512	
	Math 255	Diff Equations and Appls	5	Math 2255	Differential Equations and Appls	3	1, 2**, 3**, 4	replaces 255	
	Math 607	Essentials of Numerical Analysis	5	Two of the following three:					
	Math 514	Complex Variables	3	Math 3607	Beginning Scientific Computing	3	3**, 4, 5*	replaces parts of 607	
				Math 4552	Complex Analysis	3	1*, 2**, 3*, 4*, 5*	replaces 552, expands on 514	
				Math 4556	Dynamical Systems	3	1, 3*, 4*, 5*	expands on 556	
Electives (at least 9 quarter hours in math and 9 in the applied area):									
Electives (at least 6 units in math and 6 in the applied area):									
Group I - Math									
	Math 556	Differential Eqs I	3						
	Math 513 or 551	Vector Analysis	3 or 5	Math 4551	Vector Analysis	3	1*, 3*, 4*, 5*	replaces 513 & 551	
	Math 601, 602, or 603.02	Math Principles in Science I, II, III	3, 3, 3	Math 5101, 5102	Linear Math in Finite & Infinite Dimensions	3, 3	1, 2**, 3*, 5*	5101-5102 replace 601-602- 603.02	
	Math 547, 548, 549	Intro Analysis I, II, III	3, 3, 3	Math 4547, 4548	Introductory Analysis 1, 2	3, 3	1**, 2**, 3*, 4*	4547-4548 replace 547-548-549	
	Math 665, 666	Applied Differential Geometry I, II	4, 4	Math 5756, 5757	Methods in Relativity Theory I, II	3, 3	3, 4*, 5*	5756-5757 replace 665-666	
	Math 701	Calculus of Variation & Tensors	5	Math 5451	Calculus of Variation & Tensors	3	1, 2, 3*, 4, 5**	replaces 701	
Group II - Applied Area									
Option 1: Physics									
	Phys 261-262-263	Dyn of Particles & Waves I, II, III	4, 4, 4	Phys 2300-2301	Dyn of Particles & Waves I, II, III	4, 4, 4	5**	Phys 2300-2301 replace Phys 261-262-263	
Option 2: Chemistry									
	Chem 221	Analytical Chemistry	5	Chem 2210	Analytical Chemistry	5	5**	Chem 2210 expands on Chem 221	
	Chem 530-531-531	Physical Chemistry 1, 2, 3	3, 3, 3	Chem 4300-4310	Physical Chemistry 1, 2	3, 3	5**	Chem 4300-4310 replace Chem 530-531-532	
Major program learning outcomes									
	1	Learn conceptual frameworks needed to study higher mathematics, including an introduction to mathematical reasoning, and an understanding of how to read and write proofs.							
	2	Acquire basic mastery of core areas of mathematics, including calculus, analysis and algebra.							
	3	Develop powerful mathematical problem solving skills.							
	4	Learn to communicate mathematical understanding effectively.							
	5	Become proficient in chosen tracks within the major.							
* Learning outcomes are indicated for each semester course listed. Number of asterisks indicates level: beginning, intermediate, or advanced.									

Math Major, Financial Track 57 - 59 quarter hrs become 41 - 42 semester credit hrs.								
Segment of major program	Quarter course #	Quarter course name	Credit hours	Semester course #	Semester course name	Units	Learning outcome	Nature of conversion
Prerequisites (35 quarter credit hours become 23 semester credit hours; some may double-count in GEC)								
	Math 151	Calculus and Analytic Geometry I	5	Math 1151	Calculus 1	5	1, 2, 3	
	Math 152	Calculus and Analytic Geometry II	5	Math 1152	Calculus 2	5	1, 2, 3	1151-1152 replaces 151-152-153
	Math 153	Calculus and Analytic Geometry III	5					
	Acct 310	Foundations of Accounting	5	Acct 2000	Foundations of Accounting	3	3, 5*	Acct 2000 replaces Acct 310
	Econ 200	Principles of Microeconomics	5	Econ 2001.01	Principles of Microeconomics	3	3, 5*	Econ 2001.01 replaces Econ 200
	Econ 201	Principles of Macroeconomics	5	Econ 2002.01	Principles of Macroeconomics	3	3, 5*	Econ 2002.01 replaces Econ 200
	CSE 200	Computer Assisted Problem Solving for Business	5	CSE 1113	Computer Assisted Problem Solving for Business	4	3, 5*	CSE 1113 replaces CSE 200
Core major requirements (20 or 22 quarter credit hours become 17 or 18 semester credit hours)								
	Math 254	Calculus and Analytic Geometry IV	5	Math 2153	Calculus 3	4	1*, 2*, 3**	expands on 254
	Math 345	Foundations of Higher Math	4	Math 3345	Foundations of Higher Math	3	1**, 2**, 3*, 4*	expands on 345
	Math 530 or Stat 420	Probability or Intro to Math Stat I	3 or 5	Math 4530 or Stat 4201	Probability or Intro to Math Stat I	3 or 4	1**, 2, 3**, 4*, 5*	
	Math 568	Linear Algebra	3	Math 2568	Linear Algebra	3	1*, 2**, 3, 5	expands on 568 or 571
	Stat 421	Intro to Math Stat II	5	Stat 4202	Intro to Math Stat II	4	1, 3, 5*	Stat 4202 replaces Stat 421
Required courses in track (36 quarter credit hours become 24 semester credit hours)								
	Math 255	Differential Equations and Their Applications	5	Math 2255	Differential Equations and Their Applications	3	1, 2**, 3**, 4*	replaces Math 255
	Math 512	Partial Differential Equations & Boundary Value Problems	3	Math 4557	Partial Differential Equations	3	1, 2**, 3**, 5**	replaces 512 or 557
	Math 588	Practicum in Actuarial Science	4					no longer offered to Financial Math majors
	Math 589	Introduction to Mathematical Finance	3	Math 3589	Introduction to Financial Mathematics	3	3*, 4*, 5**	replaces 589
	Math 607	Essentials of Numerical Analysis	5	Math 3607	Begin Sci Computing	3	3*, 4*, 5**	replaces parts of 607
	Math 618	Theory of Interest	4	Math 3618	Theory of Interest	3	3*, 4**, 5**	replaces 618
	Math 632	Actuarial Mathematics III	4	Math 5632	Financial Economics	3	3*, 4*, 5**	replaces 632
	Bus 420 or 620	Foundations of Finance, Business Finance	4 or 4	Bus Fin 2220 or 3280	Foundations of Finance, Business Finance	3, 3	3*, 4*, 5**	replaces BUS 420, 620
	CSE 201 or 202	Elementary Computer Programming, Intro. to Programming & Algorithms	4 or 4	CSE 1223, 1222	Intro to Computer Prog. in Java, Intro to Computer Prog. in C++	3, 3	3, 5*	replaces CSE 201, 202
Electives	none			none				
Major program learning outcomes								
	1	Learn conceptual frameworks needed to study higher mathematics, including an introduction to mathematical reasoning, and an understanding of how to read and write proofs.						
	2	Acquire basic mastery of core areas of mathematics, including calculus, analysis and algebra.						
	3	Develop powerful mathematical problem solving skills.						
	4	Learn to communicate mathematical understanding effectively.						
	5	Become proficient in chosen tracks within the major.						
* Learning outcomes are indicated for each course listed. Number of asterisks indicates level: beginning, intermediate, or advanced.								

SAMPLE FOUR-YEAR PLANS

Italic indicates prerequisite courses, not counted in the major.

Math Major: **Theoretical Track** **Quarters**

	Au	Wi	Sp	Hours in major
YR 1.	<i>Math 151 (5)</i> GEC	<i>Math 152 (5)</i> GEC	<i>Math 153 (5)</i> GEC	0
YR 2.	Math 254 (5) GEC	Math 255 (5) GEC	Math 345 (4) Math 568 (3) GEC	17
YR 3.	Math 580 (3) Math 530 (3) or Stat 420 (5) GEC	Math 581 (3) Stat 421 (5) GEC	Math 582 (3) GEC	17 or 19
YR 4.	Math 547 (3) Math Elective* (5) GEC	Math 548 (3) Math Elective* (5) GEC	Math 549 (3) GEC	19

Math Major: **Theoretical Track** **Semesters**

	Au	Sp	Hours in major
YR 1.	<i>Math 1151 (5)</i> GE	<i>Math 1152 (5)</i> GE	0
YR 2.	Math 2153 (4) GE	Math 3345 (3) Math 2568 (3) GE	10
YR 3.	Math 4580 (3) Math 4530 (3) or Stat 4201 (4) Math 2255 (3) GE	Math 4581 (3) Stat 4202 (4) GE	16 or 17
YR 4.	Math 4547 (3) Math Elective* (3) GE	Math 4548 (3) Math Elective* (3) GE	12

* Check with your faculty adviser to determine choices for elective courses.

Math Major: **HONORS Theoretical Track** **Quarters**

	Au	Wi	Sp	Hours in major
YR 1.	Math 190H (5) GEC	Math 191H (5) GEC	Math 264H (5) GEC	15
YR 2.	Math 520H (5) GEC	Math 521H (5) GEC	Math 522H (4) GEC	15
YR 3.	Math 594H (5) or Math 531H Math 590H (5) GEC	Math 540H (5) or Math 576H (5) Math 591H (5) GEC	Math 541H (5) or Math 577H (5) Math 592H (5)	30
YR 4.	Math 531H (5) GEC	Stat 421 (5) GEC	GEC GEC	10

Math Major: **HONORS Theoretical Track** **Semesters**

	Au	Sp	Hours in major
YR 1.	Math 4190H (5) GE	Math 4191H (5) GE	10
YR 2.	Math 5520H (5) GE	Math 5522H (5) GE	10
YR 3.	Math 5529H (5) or Math 5576H (5) GE	Math 5530H (5) or Math 5540H (5) GE	19
YR 4.	Math 5590H (5) Stat 4202 (4) GE	Math 5591H (5) GE	10

Math Major: Education Track **Quarters**

	Au	Wi	Sp	Hours in major
YR 1.	<i>Math 151 (5)</i> GEC	<i>Math 152 (5)</i> <i>CSE 201, 202,</i> <i>or 221 (4)</i>	<i>Math 153 (5)</i> GEC	0
YR 2.	Math 254 (5) GEC	Math 568 (3) GEC	Math 345 (4) GEC	12
YR 3.	Math 580 (3) Stat 420 (5) GEC	Math 581 (3) Stat 421 (5) GEC	Math 582 (3) Math 578 (5) GEC	24
YR 4.	Math 547 (3) Math 507 (5) GEC	Math 548 (3) GEC	Math 549 (3) Math 504 (5) GEC	19

Math Major: Educational Track **Semesters**

	Au	Sp	Hours in major
YR 1.	<i>Math 1151 (5)</i> GE	<i>Math 1152 (5)</i> <i>CSE 1223 (3),</i> <i>1222(3), or 2221 (4)</i>	0
YR 2.	Math 2153 (4) GE	Math 3345 (3) Math 2568 (3) GE	10
YR 3.	Math 4580 (3) Stat 4201 (4) GE	Math 4581 (3) Stat 4202 (4) GE	14
YR 4.	Math 4547 (3) Math 4504 (3) Math 4507 (3) GE	Math 4548 (3) Math 4578 (4) GE	16

Math Major: **Bio-Math Track Quarters**

	Au	Wi	Sp	Hours in major
YR 1.	<i>Math 151 (5)</i> <i>Chem 121 (5)</i> GEC	<i>Math 152 (5)</i> <i>Bio 113 (5)</i> GEC	<i>Math 153 (5)</i> <i>Bio 114 (5)</i> GEC	0
YR 2.	Math 254 (5) GEC	Math 255 (5) Stat 420 (5) GEC	Math 345 (4) Math 512 (3) Stat 421 (5)	27
YR 3.	Math 571 (3) MolGen 660 (5) GEC	Math 572 (3) MolGen 661 (5) GEC	Math 350 (3) GEC	19
YR 4.	Math or Bio* (3) GEC	Math 607 (5) Math or Bio* (3) GEC	Math or Bio* (3) GEC	14

Math Major: **Bio-Math Track Semesters**

	Au	Sp	Hours in major
YR 1.	<i>Math 1151 (5)</i> <i>Chem 1210 (5)</i> GE	<i>Math 1152 (5)</i> <i>Bio 1113 (4)</i> GE	0
YR 2.	Math 2153 (4) Stat 4201 (4) <i>Bio 1114 (4)</i>	Math 2255 (3) Stat 4202 (4) GE	15
YR 3.	Math 2568 (3) Math 3345 (3) GE	Math 4556 (3) Math 3350 (3) GE	12
YR 4.	Bio 2401 (4) Math 3607 (3) GE	Math or Bio Elective* (3) Math or Bio Elective* (3) GE	13

* Check with your faculty adviser to determine choices for elective courses.

Math Major: Applied Track **Quarters**

	Au	Wi	Sp	Hours in major
YR 1.	<i>Math 151 (5)</i> GEC	<i>Math 152 (5)</i> <i>Physics 131 (5)</i> GEC	<i>Math 153 (5)</i> <i>Physics 132 (5)</i> GEC	0
YR 2.	Math 254 (5) <i>Physics 133 (5)</i> GEC	Math 255 (5) GEC	Math 345 (4) Math 512 (3) GEC	17
YR 3.	Math 571 (3) Stat 420 (5) GEC	Math 572 (3) Math 607 (5) GEC	Math 514 (3) Stat 421 (5) GEC	24
YR 4.	Math Elective* (3) Applied Elective* (3) GEC	Math Elective* (3) Applied Elective* (3) GEC	Math Elective* (3) Applied Elective* (3) GEC	18

Math Major: Applied Track **Semesters**

	Au	Sp	Hours in major
YR 1.	<i>Math 1151 (5)</i> <i>CSE 1222 (3)</i> GE	<i>Math 1152 (5)</i> <i>Physics 1250 (5)</i> GE	0
YR 2.	Math 2153 (4) <i>Physics 1251 (5)</i> GE	Math 3345 (3) Math 2255 (3) Math 2568 (3)	13
YR 3.	Stat 4201 (4) Math 3607 (3) Math 4557 (3)	Stat 4202 (4) Math 4552 (3) GE	17
YR 4.	Math Elective* (3) Applied Elective* (3) GE	Math Elective* (3) Applied Elective* (3) GE	12

* Check with your faculty adviser to determine choices for elective courses.

Math Major: **Financial Track Quarters**

	Au	Wi	Sp	Hours in major
YR 1.	<i>Math 151 (5)</i> <i>CSE 200 (5)</i> GEC	<i>Math 152 (5)</i> <i>Econ 200 (5)</i> GEC	<i>Math 153 (5)</i> <i>Econ 201 (5)</i> GEC	0
YR 2.	Math 254 (5) <i>Acct 310 (5)</i> GEC	Math 255 (5) CSE 201 (4) GEC	Math 345 (4) Math 568 (3) GEC	21
YR 3.	Stat 420 (5) GEC	Stat 421 (5) Math 512 (3) GEC	Bus Fin 620 (4) GEC	17
YR 4.	Math 618 (4) GEC	Math 589 (3) Math 607 (5) GEC	Math 588 (4) Math 632 (4) GEC	20

Math Major: **Financial Track Semesters**

	Au	Sp	Hours in major
YR 1.	<i>Math 1151 (5)</i> <i>CSE 1113 (4)</i> GE	<i>Math 1152 (5)</i> <i>Econ 2001.01 (3)</i> GE	0
YR 2.	Math 2153 (4) <i>Econ 2002.01 (3)</i> <i>Acct 2000 (3)</i>	Math 3345 (3) Math 2568 (3) GE	10
YR 3.	Stat 4201 (4) Math 2255 (3) CSE 1222 (3) GE	Stat 4202 (4) Math 4557 (3) Math 3589 (3) GE	20
YR 4.	Math 3618 (3) Math 3607 (3) GE	Math 5632 (3) Bus Fin 3280 (3) GE	12

Transition Policies and Plans

Requirements for a B.S. in Mathematics will undergo minimal changes in the conversion to semesters. Every math course or course sequence (prerequisite, required, or elective) under quarters will have a corresponding course or course sequence under semesters. In some cases this transition involves an increase in credit hours, typically motivated by the expectation that upper division semester math courses will be 3 credits. In most cases, these increases are balanced by small rearrangements of required and elective courses.

Transition policies for freshman-level courses are more difficult to work out because those courses are usually in a long sequence that can be entered at different points. The only one of those transitions that is relevant for math majors is the mainstream calculus sequence, Math 151-152-153-254. Those plans are outlined on a separate page below.

Two difficult transition arise in upper division courses taken by math majors:

Students might be part way through a 500-level math course sequence at the end of Spring 2012.

This can happen for Math **547-548-549** and **580-581-582**, corresponding to Math **4547-4548** and Math **4580-4581**. Those course sequences in quarters begin in both Autumn and Winter. Each of the four corresponding semester courses will be offered in both Autumn and Spring Semesters.

Since Math 547 and 580 are not offered in Spring, few students will have credit for just one course in the sequence when semesters arrive. Those students will be guided by advisors on a case by case basis.

Students who complete Math 547-548 in Winter and Spring of 2012 will enter the 3-credit transition course Math **4544** offered only in Au12. Math 4544 will be Math 549 done in a semester. This could be done in a 2-credit course but it makes sense to use the standard 3 credits, include some extra topics, and proceed at a less hectic pace through the mathematical ideas. This arrangement will not cause delays in graduation.

Students who complete Math 580-581 in Winter and Spring of 2012 will enter the 3-credit transition course Math **4584** offered only in Au12. Math 4584 will be Math 582 done in a semester. This could be done in a 2-credit course but it makes sense to use the standard 3 credits, include some extra topics, and proceed at a less hectic pace through the mathematical ideas. This arrangement will not cause delays in graduation.

ADVISING.

Three full-time counselors are currently available in the *Math Advising Office* for walk-in appointments to help students determine their best paths through the many options for math at OSU. General information about that office is posted at <http://www.math.ohio-state.edu/counseling>. Those counselors devote most of their effort assisting students from other departments. They evaluate math transfer credit, deal with issues involved with the Math Placement Exam, advise students who are having difficulties with math classes, work with many activities to recruit new freshmen, etc. In addition, the math counselors work closely with Math and Actuarial Science majors, helping them complete major and minor program forms and facilitating the process of connecting majors with faculty advisors.

From Winter 2011 through Spring 2012 the math advisors will send messages to all undergraduate majors in the Math Department, highlighting the various math course options available with semesters. They will direct the efforts to complete a TAP form for every math and actuarial science major who will be at OSU after Sp12. We expect that the Department's staff members, faculty advisors, and departmental administrators will be able to deal with the expected numbers of those majors who encounter difficulties in the process of conversion to semesters.

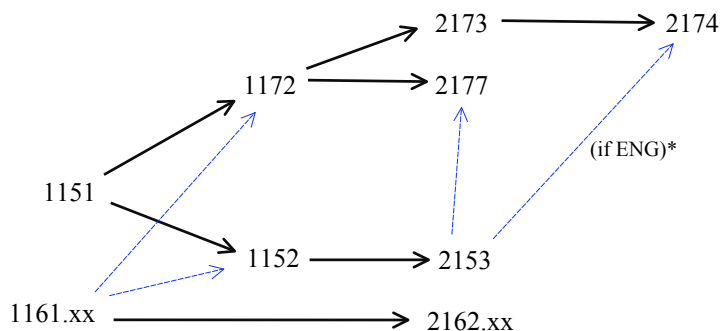
However, throughout 2012 we expect floods of students from outside the Math Department to visit the Math Advising Office with questions about transition processes, especially concerning semester transitions of the many lower-division math courses. We hope that the Department will be able to find funds to hire enough extra help during the transition year to make it possible to handle that advising burden.

Calculus transition plans.

With semesters, calculus will split into different strands.

Note: 1151, 1152, 2153, 2568, and 2255 satisfy the *Transfer Assurance Guides* provided by Ohio's Board of Regents.

Course sequences starting with calculus	majors that use them
• Standard Calculus: 1151 – 1152 – 2153 – 2568 – 2255	math, act sci, some sciences
• Eng. Calculus: 1151 – 1172 – 2173 – 2174	AE, ISE, ME, CBE, Eng Phys
• Eng. Calculus Topics: 1151 – 1172 – 2177	BME, CEEGS, FABE, MSE, WE
• Calc – LinAlg – DiffEq: 1151 – 1172 – 2568 – 2415	ECE
• Calculus + Discrete: 1151 – 1172 – 2568 – 2566	CSE, CIS
• Accelerated Calculus: 1161 – 2162 (+ 2568 + 2415)	FEH
• Honors Calculus: 1181H – 2182H	honors math
• Honors Analysis: 4190H – 4191H	honors math



Arrows indicate ways students may move among these courses:

Dotted line: allowed but not recommended (e.g. because of overlapping material).

No arrow from X to Y: students with credit for Course X may not enroll in Course Y.

Honors courses

Students with C- or better in 1181H or 4190H may enter 1172 or 2153.

Linear Algebra

2568 prereq: C- or better in 1172, 2153, 2162.xx, 1181H, or 4191H.

Diff Eqs:

2255 prereq: C- or better in 2153, or 2162.xx, or 2173.

Note: 2255 and 2415 exclude each other.

2415 prereq: C- or better in 2153, or 2162.xx, or 2173, or {1172 and 2568}.

4556 prereq: C- or better in 2153, or 2162, or 2173.

4557 prereq: C- or better in 2255 or 2415.

4512 prereq: C- or better in 2174, 2255, 2415 or equivalent.

Note: 4512 is intended for engineers.

* Math and Act Sci majors with credit for Math 2174 must also take 2255 and 2568, even though that involves overlaps in content.

Here are short descriptions of these courses. Credit hours are indicated in parentheses.

- 1151 Calculus 1** (5) limits, derivatives, max-min, definite integrals, Fundamental Theorem.
- 1152 Calculus 2** (5) integration techniques, sequences and series, convergence tests, Taylor series, parametric and polar curves, (optional: vectors).
- 1161 Accelerated Calculus 1** (5) limits, derivatives, max-min, integrals, techniques of integration, applications.
- 1172 Engineering Math A** (5) integration, sequences & series, Taylor series, vectors and parametric curves, several variables, partial derivatives, max-min.
- 2153 Calculus 3** (4) vectors, several variables, partial derivatives, max-min, multiple integrals, line integrals and vector fields, divergence, curl, integration theorems.
- 2162 Accelerated Calculus 2** (5) sequences & series, Taylor series, vectors, parametric curves, partial derivatives, optimization, multiple integrals, line integrals, divergence, curl, integration theorems.
- 2173 Engineering Math B** (3) multiple integrals, line integrals, vector fields, second order constant coefficient ODEs.
- 2174 Linear Algebra and Differential Equations** (3) vectors, matrices, diagonalization, systems of linear ODEs, Fourier series, PDEs.
- 2177 Mathematical Topics for Engineers** (4) multiple integrals, line integrals, matrices and linear systems, constant coefficient ODEs, Fourier series, PDEs.
- 2255 ODEs** (3) first order methods, existence and uniqueness, second order linear equations, Wronskian, undetermined coefficients, variation of parameter, series solutions, Laplace transform.
- 2415 ODEs and PDEs** (3) first and second order ODEs, Fourier series, constant coefficient PDEs, boundary and initial value problems, systems of ODEs.
- 2568 Linear Algebra** (3) systems of equations, matrices, vector spaces, dimension, linear transformations, determinants, eigenvalues, diagonalization, orthogonality.
- 4512 Applied PDEs** (3) first and second order equations, boundary value problems, separation of variables, Fourier series, Green's functions, wave and diffusion equation, Schrodinger's equation, Bessel functions.
- 4556 Dynamical Systems** (3) systems of linear, first-order ODEs, existence and uniqueness, phase plane analysis, bifurcation theory, stability, oscillations, applications and modeling.
- 4557 PDEs** (3) first and second order PDEs, initial value and boundary value problems, Fourier series, Green's functions, nonlinear theory: wave, heat, and Laplace equation. Applications.

Abbreviations: ODE = ordinary differential equation, PDE = partial differential equation.

TRANSITION PLANS for Freshman Calculus.

Here are different scenarios for students at the end of Spring 2012. More detailed information about Math course transition options appears in separate documents, posted at www.math.ohio-state.edu/semesters.

- *Completed 151-152-153:* may take 2153, (not 2173 or 2177).
- *Engineers on track to complete 151-152-153:* In Sp12, take the 5-credit transition course **Math 154** instead of 153. With credit for 154, they may enter Math 2173 or 2177, (not 2153).

- *Completed 151-152:* may enter 1152 or 1172, but that direct transition repeats about 6 weeks of material. There are two ways to avoid that overlap.

(1) Students with credit for Math 151 in Wi12 may enroll in **Math 114**, a transition course (3 quarter-credits, graded P/NP) in Sp12, or in **Math 114** (2 semester-credits, graded P/NP) in Su12. We expect to offer those transition courses in two formats:

- with a live teacher (only if there is sufficient enrollment),
- as an on-line, self-study module, with a proctored Final Exam.

Credit for Math 151 plus {114 or 1114} will yield credit equivalent to Math 1151. Students with P in Math 114 or 1114 are eligible to enter Math 1152 or 1172. (Note: The P grade here corresponds to "C- or better".)

(2) Students with credit for Math 152 in Sp12 may enter the 3-credit transition courses **Math 1534** or **1544**. These courses correspond directly to the quarter courses:

- 1534 = Math 153 presented in a semester. Students with credit for 1534 may enter Math 2153.
- 1544 = Math 154 presented in a semester. Students with credit for 1544 may enter Math 2173 or 2177.

- *Completed 151:*

Advising at the end of Sp12: Math 1114 is an option, but students are advised to **avoid** taking the on-line version of Math 1114 (mentioned above). Either take the live course in Columbus, or delay starting calculus to Au12.

NOTES:

Students with credit for Math 151 but without a P in 114 or 1114, will be allowed to enroll in Math 1151 in Au12, even though that involves repetition of all the material discussed in Math 151.

AP-Calculus credit:

Students who took AP-calculus exams in high school will get credit for certain OSU calculus courses.

Score	Credit for:	Recommended Courses
AB-1, AB-2, BC-1, BC-2	no credit	Use OSU Math Placement Exam
AB-3	1151	1151
AB-4	1151	1152 or 1172
AB-5	1151	1161.xx, 1152, 1172; or 1181H or 4190H with advisor approval
BC-3	1151	1161.xx, 1152, 1172; or 1181H or 4190H with advisor approval
BC-4, 5	1151, 1152	2153; or 1181H, 4190H with advisor approval, or: 1162.02 or 2162.02: with FEH-advisor approval

Generic transition schedules.

The next page provides generic course schedules for math majors (theoretical track) who will experience the transition to semesters at different points in their undergraduate careers. Credit hours are indicated to the right of each course in the major program. Similar schedules can be generated for the other tracks.

Nearly all math majors will move smoothly to the new system. We expect a few difficulties to arise, for unanticipated reasons. That might lead to a few individual studies courses run by appropriate faculty members.

Math Major – Theoretical Track

Sample curricula for students at different stages of the semester transition

Graduating ≤ Sp12	Graduating Sp13	Graduating Sp14	Graduating Sp15	Graduating ≥ Sp16
(Au08)	(Au09)	(Au10)	(Au11)	(Au12)
Math 151 (Calc I) 5	Math 151 (Calc I) 5	Math 151 (Calc I) 5	Math 151 (Calc I) 5	Math 1151 (Calc 1) 5
Math 152 (Calc II) 5	Math 152 (Calc II) 5	Math 152 (Calc II) 5	Math 152 (Calc II) 5	Math 1152 (Calc 2) 5
Math 153 (Calc III) 5	Math 153 (Calc III) 5	Math 153 (Calc III) 5	Math 153 (Calc III) 5	GECs
GECs	GECs	GECs	<u>GECs</u>	
Math 254 (Cal IV) 5	Math 254 (Calc IV) 5	Math 254 (Calc IV) 5	Math 2153 (Calc 3) 4	Math 2153 (Calc 3) 4
Math 255 (ODE) 5	Math 255 (ODE) 5	Math 255 (ODE) 4	Math 2255 (ODE) 3	Math 2255 (ODE) 3
Math 345 (Hi Math) 4	Math 345 (Hi Math) 4	Math 345 (Hi Math) 4	Math 3345 (Hi Math) 3	Math 3345 (Hi Math) 3
Math 568 (Lin Alg) 3	Math 568 (Lin Alg) 3	Math 568 (Lin Alg) 3	Math 2568 (Lin Alg) 3	Math 2568 (Lin Alg) 3
GECs	GECs	<u>GECs</u>	GECs	GECs
Math 580 (Ab Alg I) 3	Math 580 (Ab Alg I) 3	Math 4580 (Ab Alg 1) 3	Math 4580 (Ab Alg 1) 3	Math 4580 (Ab Alg 1) 3
Math 581 (Ab Alg I) 3	Math 581 (Ab Alg I) 3	Math 4581 (Ab Alg 2) 3	Math 4581 (Ab Alg 2) 3	Math 4581 (Ab Alg 2) 3
Math 582 (Ab Alg I) 3	Math 582 (Ab Alg I) 3	Math 4530 (Prob) 3	Math 4530 (Prob) 3	Math 4530 (Prob) 3
Math 530 (Prob) 3	Math 530 (Prob) 3	Stat 4201 (Stat) 4	Stat 4201 (Stat) 4	Stat 4201 (Stat) 4
Stat 421 (Stat) 5	Stat 421 (Stat) 5	GECs	GECs	GECs
GECs	<u>GECs</u>			
Math 547 (An I) 3	Math 4547 (An 1) 3	Math 4547 (An 1) 3	Math 4547 (An 1) 3	Math 4547 (An 1) 3
Math 548 (An II) 3	Math 4548 (An 2) 3	Math 4548 (An 2) 3	Math 4548 (An 2) 3	Math 4548 (An 2) 3
Math 549 (An III) 3	Math 4507 (Geom) 3	Math 4507 (Geom) 3	Math 4507 (Geom) 3	Math 4507 (Geom) 3
Math 507 (Geom) 5	Math 4552 (Cx An) 3	Math 4552 (Cx An) 3	Math 4552 (Cx An) 3	Math 4552 (Cx An) 3
Math 552 (Cx Vbl) 5	GECs	GECs	GECs	GECs
<u>GECs</u>				