Fiscal Unit/Academic Org	Mathematics - D0671
Administering College/Academic Group	Mathematical And Physical Sci
Co-adminstering 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-BA
Current Degree Title	Bachelor of Arts

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	3	0.3
	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.BA.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

- the attachment fulfills several goals. *(by Shapiro,Daniel B on 03/17/2011 08:43 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Shapiro,Daniel B	03/17/2011 08:43 PM	Submitted for Approval
Approved	Shapiro,Daniel B	03/17/2011 10:22 PM	Unit Approval
Approved	Andereck,Claude David	03/22/2011 03:35 PM	College Approval
Pending Approval	Hanlin,Deborah Kay Vankeerbergen,Bernadette Chantal Meyers,Catherine Anne Jenkins,Mary Ellen Bigler Nolen,Dawn	03/22/2011 03:35 PM	ASCCAO Approval

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.

Luis Casian
Professor and Chair

Rationale for semester plans: BA 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 → semester.

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

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
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)		**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**	

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 (SEMESTERS)
Colleges of the Arts and Science

			Mathematics Major – Theoretical Track

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?		**X**
(NOTE: This form is NOT a degree application)		

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:

Courses	Hours	Grade	Courses	Hours	Grade
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**	

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: Education Track

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? | | X |
(NOTE: This form is NOT a degree application)

         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 Educational Track:

Courses	Hours	Grade	Courses	Hours	Grade
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: | X | |

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 (SEMESTERS)
Colleges of the Arts and Science

			Mathematics Major: Education Track

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		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:

Courses	Hours	Grade	Courses	Hours	Grade
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**	

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

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)**		**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**		**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**	

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 (SEMESTERS)
Colleges of the Arts and Science

			Mathematics Major: Bio-Math Track

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		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:

Courses	Hours	Grade	Courses	Hours	Grade
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	

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: Applied Track - Chemistry Option
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? | | X |
(NOTE: This form is NOT a degree application)

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		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	

56 to 59
Total of Part B only

Check whether this is:	x	

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 (SEMESTERS)
Colleges of the Arts and Science

			Mathematics Major: Applied Track - Chemistry Option

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.					

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Total of Part B only

Check whether this is:	**x**	

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: Applied Track - Physics Option
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)		X
	yes	no

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

Mathematics Major: Applied Track - Physics Option	Physics

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:			**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: 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	
	original	revision

See back for information about major programs.
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:

A.Forms 9

MAJOR PROGRAM FORM (SEMESTERS)
Colleges of the Arts and Science

			Mathematics Major: Applied Track - Physics Option

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?		**X**
(NOTE: This form is NOT a degree application)		

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 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**	

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:

A.Forms 10

MAJOR PROGRAM FORM (QUARTERS)
Colleges of the Arts and Science

			Mathematics Major - Financial Track

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)**		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

Courses	Hours	Grade	Courses	Hours	Grade
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	

See back for information about major programs.   original   revision
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Signature of faculty adviser

Name of adviser (please print)

Mathematics	

Department   **Campus phone**

Date:	

MAJOR PROGRAM FORM (SEMESTERS)
Colleges of the Arts and Science

			Mathematics Major – Financial Track

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		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:	

B.Curriculum Map 2

B.Curriculum Map 3

B.Curriculum Map 5

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.	*Math 151 (5)* GEC	*Math 152 (5)* GEC	*Math 153 (5)* 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.	*Math 1151 (5)* GE	*Math 1152 (5)* 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

C.Plans 2

Math Major: **Education Track** **Quarters**

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

Math Major: **Educational Track** **Semesters**

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

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

	Au	Wi	Sp	Hours in major
YR 1.	*Math 151 (5)* *Chem 121 (5)* GEC	*Math 152 (5)* *Bio 113 (5)* GEC	*Math 153 (5)* *Bio 114 (5)* 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.	*Math 1151 (5)* *Chem 1210 (5)* GE	*Math 1152 (5)* *Bio 1113 (4)* GE	0
YR 2.	Math 2153 (4) Stat 4201 (4) *Bio 1114 (4)*	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.	*Math 151 (5)* GEC	*Math 152 (5)* *Physics 131 (5)* GEC	*Math 153 (5)* *Physics 132 (5)* GEC	0
YR 2.	Math 254 (5) *Physics 133 (5)* 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.	*Math 1151 (5)* *CSE 1222 (3)* GE	*Math 1152 (5)* *Physics 1250 (5)* GE	0
YR 2.	Math 2153 (4) *Physics 1251 (5)* 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.	*Math 151 (5)*	*Math 152 (5)*	*Math 153 (5)*	0
	CSE 200 (5)	*Econ 200 (5)*	*Econ 201 (5)*	
	GEC	GEC	GEC	
YR 2.	Math 254 (5)	Math 255 (5)	Math 345 (4)	21
	Acct 310 (5)	CSE 201 (4)	Math 568 (3)	
	GEC	GEC	GEC	
YR 3.	Stat 420 (5)	Stat 421 (5)	Bus Fin 620 (4)	17
	GEC	Math 512 (3)	GEC	
		GEC		
YR 4.	Math 618 (4)	Math 589 (3)	Math 588 (4)	20
	GEC	Math 607 (5)	Math 632 (4)	
		GEC	GEC	

Math Major: **Financial Track** Semesters

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

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
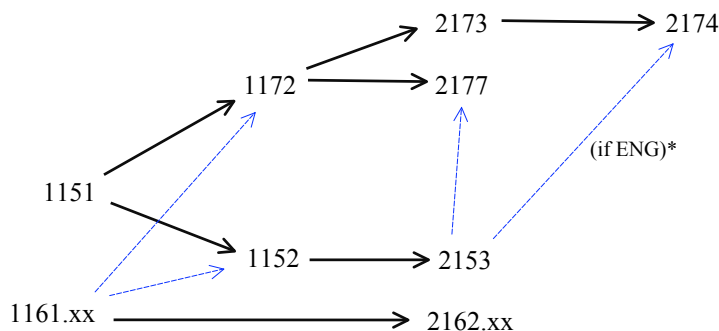
Arrows indicate ways students may move among these courses:

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.

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* 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.

Abbeviations: 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.eud/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 1114** (2 semester-credits, graded P/NP) in Su12. We expect to offer those transition courses in two formats:
   (i) with a live teacher (only if there is sufficient enrollment),
   (ii) 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	GEs	
GECs		GECs		GECs		GECs			
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		GECs		GEs		GEs	
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	GEs		GEs		GEs	
GECs		GECs							
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	GEs		GEs		GEs		GEs	
GECs									