

OWG 7 Math Approved Recommendations

1. Recommends that MATH 1101: Math Modeling be addressed in the catalog for the new ASU as follows:

Title: MATH 1101: Math Modeling - eCore only

Course Description: This course is an introduction to mathematical modeling using graphical, numerical, symbolic and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communications of quantitative concepts and results. *MATH 1101 may be taken as a substitute for MATH 1001: Quantitative Reasoning.*

2. Recommends implementing the following course description and prerequisites for MATH 2008 – Foundations of Numbers and Operations:

Course Description: This course is an Area F introductory mathematics course for teacher education majors. This course will emphasize the understanding and use of the major concepts of number and operations. As a general theme, strategies of problem solving will be used and discussed in the context of various topics.
Prerequisites: MATH 1001, MATH 1111, MATH 1113 or approved equivalent.

3. Recommends implementing the following common course numbers/names:

- **MATH 2411 - Introduction to Statistics**
(Course number change for DSC, Name change for ASU)
- **MATH 1211 - Calculus I**
(Course number change for DSC, Name Change for ASU)
- **MATH 2212 - Calculus II**
(Course number change for DSC)
- **MATH 2213 - Calculus III**
(Course number change for DSC)
- **MATH 2111 - Linear Algebra**
(Course number change for DSC)
- **MATH 1113 - Pre-Calculus**
(Name Change for ASU)

4. Recommends discontinuing the following courses:

- MATH 1145 – Survey of Calculus
- MATH 1112 – Trigonometry

5. Recommends implementing the following changes to current DSC classes:

- Discontinue *CSCI 2200 – Internet Technologies*
- Discontinue *CSCI 2500 – Discrete Structures*
- For *COPR/CSCI 2235 – Database Management Systems*

6. Recommends implementing the follow course change at ASU:

- Discontinue MATH 1101: Mathematical Modeling
- Include MATH 1001: Quantitative Reasoning:

7. Recommends implementing the following common prerequisite designations:

- MATH 2411 – Introduction to Statistics
Prerequisites: MATH 1001, 1111 or 1113
- MATH 2111 – Linear Algebra
Prerequisites: MATH 1211 (Calculus I):

**MATH 2411 – Introduction to Statistics Prerequisites: MATH 1001, 1111
or 1113**

8. Recommends the outline that follows for the proposed Area F for a BS in Computer Science (Business Emphasis) degree shown within the context of the complete program of study:

Core Curriculum (60 hours)

AREAS A-E		42
AREA F Courses Related to Major		18
MATH 1211¹	Calculus I	4

¹ Calculus is an Area F requirement per BOR Advisory Committee:

http://www.usg.edu/academic_programs/areaf/compsci_Computer_Science.pdf

If Calculus is taken in Area A or D, one hour applies to Area F.

CSCI 1300²	Intro to Computer Science	3
CSCI 1301	Computer Science I	4
CSCI 1302	Computer Science II	4
MATH 2411	Basic Statistics	3

Area A – F Subtotal **60**

Above The Core (5 hours)

Computer Science Courses (30 hours)

CSCI 2211	Visual Basic Programming	3
CSCI 3111	Discrete Structures	3
CSCI 3122	Data Structures (or MATH 3112)	3
CSCI 3132	Database Management	3
CSCI 4211	Systems Analysis I	3
CSCI 4212	Systems Analysis II	3
CSCI 4113	Operating Systems	3
CSCI 4123	Computer Networks	3
CSCI 4311	Computer Graphics	3
CSCI 4921	Senior Project I	1
CSCI 4922	Senior Project II	2

Mathematics Courses (6 hours)

MATH 2111	Linear Algebra	3
MATH 3423	Intro to Operations Research	3

Business Courses (12 hours)

ACCT 2101	Accounting Principles I	3
ACCT 2102	Accounting Principles II	3
ECON 2105	Principles of Macroeconomics	3
ECON 2106	Principles of Microeconomics	3

Major Electives (12 hours) from the following courses:³

At least 9 hours in upper-level classes

CSCI 2300	Computational Informatics I	3
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² New common number for this class

³ If required courses are taken in Areas A-E, add additional electives to reach total hours.

CSCI 2311	Advanced Visual Basic Programming	3
CSCI 3200	Design & Analysis of Algorithms	3
CSCI 3300	High Performance Computing	3
CSCI 4221	Software Engineering	3
CSCI 4915	Web Design & Development	3
CSCI 4911	Special Topics in Computer Science	3
Upper-level classes in BUSA, ECON, or MGMT,		

TOTAL CREDIT HOURS: 125

³ If required courses are taken in Areas A-E, add additional electives to reach total hours.

9. Recommends the outline that follows for the proposed Area F for a BS in Computer Science (Math Emphasis) degree shown within the context of the complete program of study:

Core Curriculum (60 hours)

AREAS A-E		42
AREA F Courses Related to Major		18
CSCI 1300⁴	Intro to Computer Science	3
CSCI 1301	Computer Science I	4
CSCI 1302	Computer Science II	4
MATH 1211⁵	Calculus I	4
MATH 2411	Basic Statistics	3

Area A – F Subtotal **60**

Above The Core (5 hours)

Major Requirements

Computer Science Courses (33 hours)

CSCI 3111	Discrete Structures (or Math 3112)	3
CSCI 3122	Data Structures	3
CSCI 4113	Operating Systems	3
CSCI 4123	Computer Networks	3
CSCI 3211	Computer Org and Architecture I	3

¹ New common number for this class

⁵Calculus is an Area F requirement per BOR Advisory Committee:

http://www.usg.edu/academic_programs/areaf/compSci_Computer_Science.pdf

If Calculus is taken in Area A or D, one hour applies to Area F.

CSCI 3212	Computer Org & Architecture II	3
CSCI 4151	Systems Simulation	3
CSCI 4211	Systems Analysis I	3
CSCI 4311	Computer Graphics	3
CSCI 4221	Software Engineering	3
CSCI 4921	Senior Project I	1
CSCI 4922	Senior Project II	2

Mathematics Courses (20 hours)

MATH 2111	Linear Algebra	3
MATH 2212	Calculus II	4
MATH 2213	Calculus III	4
MATH 3211	Ordinary Differential Equation	3
MATH 3423	Intro to Operations Research	3
MATH 4215	Numerical Analysis	3

Major Electives (6 hours) selected from the following

CSCI 2211	Visual Basic Programming	3
CSCI 2300	Computational Informatics I	3
CSCI 2311	Advanced Visual Basic Programming	3
CSCI 3132	Database Management	3
CSCI 3200	Design & Analysis of Algorithms	3
CSCI 3300	High Performance Computing	3
CSCI 4915	Web Design & Development	3
CSCI 4911	Special Topics in Computer Science	3

General Electives (1 Hour)⁶

TOTAL CREDIT HOURS: 125

³ If required courses are taken in Areas A-E, add additional electives to reach total hours.

10. Recommends the outline that follows for the proposed Area F for a BS in Mathematics degree shown within the context of the complete program of study as well as a sample program of study:

Core Curriculum (60 hours)

AREAS A-E		42
AREA F Courses Related to Major		18
MATH 1211⁷	Calculus I	4
MATH 2212	Calculus II	4
MATH 2213	Calculus III	4
MATH 2411	Basic Statistics	3
MATH 2111	Linear Algebra	3
Area A – F Subtotal		60

Above The Core (5 hours)***Requirements for the Major (42 hours)***

MATH 3101	Introduction to Number Theory	3
MATH 3112	Discrete Mathematics	3
MATH 3211	Ordinary Differential Equations	3
MATH 3311	Geometry and Applications	3
MATH 3314	Math Statistics	3
MATH 3411	Statistical Methods	3
MATH 3423	Operations Research	3
MATH 4111	Modern Algebra I	3
MATH 4112	Modern Algebra II*	3
MATH 4211	Elements of Analysis I	3
MATH 4212	Elements of Analysis II*	3

¹If Calculus is taken in Area A or D, one hour applies to Area F.

MATH 4214	Introduction to Complex Variables	3
MATH 4215	Numerical Analysis	3
MATH 4921	Senior Project I	1
MATH 4922	Senior Project II	2

Major Electives (12 hours) – Select 12 hours from the following

MATH 3413	Introduction to Combinatorics	3
MATH 4338	Non-Parametric Methods	3
MATH 4511	History of Mathematics	3
MATH 4328	Probability Theory	3
MATH 4220	Partial Differential Equations	3
MATH 4330	Math for Compound Interest	3
MATH 4336	Intro. to Design of Experiments	3
MATH 4344	Estimation Theory	3
MATH 4346	Introduction to Analytics	3
MATH 4322	Intro. to Fluid Mechanics	3
MATH 4324	Classical Mechanics	3
MATH 4326	Operational Methods	3

General Electives (6 Hours)⁸

TOTAL CREDIT HOURS: 125

SAMPLE PROGRAM OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS

Freshman Year	
Fall	Spring

2 If required courses are taken in Areas A-E, add additional electives to reach total hours.

Course	No. of Credit Hours	Course	No. of Credit Hours
ENGL 1101 English Comp. I	3	ENGL 1102 English Comp. I	3
MATH 1113 Precalculus	3	MATH 1211 Calculus I	4
CHEM 1211K General Chem. I	4	CHEM 1212K General Chem. II	4
Or		Or	
PHYS 2221K Introductory Phys. I	4	PHYS 2222K Introductory Phys. II	4
POLS 1101 US & GA Government	3	MATH 2411 Basic Statistics	3
ASU 1201 Found. Col. Success	2	PEDH Elective	1
HEDP 1001	1		
Total Hours	16	Total Hours	15*
Sophomore Year			
Fall		Spring	
ENGL 2111 World Lit. I101 I	3	MATH 2213 Calculus III	4
MATH 2212 Calculus II	4	Hum/Fine Arts Elective	3
COMM 1100 Public Speaking	3	Social Science Elective	3
General Electives	3	MATH 2111 Linear Algebra	3
MATH 3112 Discrete Math.	3	PEDH Elective	1
		HIST 1002 Intro. To African Diaspora	2
Total Hours	16	Total Hours	16
Junior Year			
Fall		Spring	
MATH 3213 Modern Geometry	3	MATH 4112 Modern Algebra II	3

MATH 3211 Differential Equation	3	MATH 3101 Intro. Numb. Theory	3
MATH Modern Algebra I	3	MATH 3314 Statistical Methods	3
MATH 3314 Mathematical Statistics	3	Major Elective	3
MATH 3423 Intro. To Oper. Resch.	3	Social Science Elective	3
General Elective	1		
Total Hours	16	Total Hours	15*
Senior Year			
Fall		Spring	
MATH 4211 Elements of Analysis I	3	MATH 4212 Elements of Analy. II	3
MATH 4214 Intro. To Complex Variables	3	MATH 4215 Numerical Analysis	3
Major Elective	3	Major Elective	3
Major Elective	3	MATH 4922 Senior Project II	2
MATH 4921 Senior Project I	1	General Electives	2
CSCI 1001 Intro. to Technology*	2	Social Science Elective	3
Total Hours	15*	Total Hours	16

11. Recommends that all learning support math classes and faculty be housed in the same department as the accredited math classes.

12. Recommends that the MATHCS department in the New ASU should be called the:

Department of Mathematics and Computing

13. Recommends incorporating the following course descriptions for all math courses 2000 level:

Math Course Descriptions

1. MATH 0987 Foundations for Quantitative Reasoning (3-0-3)

Description: A course designed to help students learn the basics of algebra and other topics necessary for Math 1001 - Quantitative Skills and Reasoning; including the study of elementary algebra, real number sets, set operations, linear equations, and introductory probability and statistics. This course is a first semester developmental course which will prepare the student for Math 1001 and its co-requisite course Math 0997. After successful completion of MATH 0987 with an A, B, or C, students will be required to register for MATH 1001 and MATH 0997 in their next semester of enrollment.

Prerequisites: None.

Corequisites: None.

Offered: All semesters.

2. MATH 0989 Foundations for College Algebra (3-0-3)

Description: Math 0989 is the study of elementary algebra, which will include the study of signed numbers, linear equations, polynomials and factoring. This course is a first semester developmental course which will prepare the student for Math 1111 and its co-requisite course Math 0999. After successful completion of MATH 0989 with an A, B, or C, students will be required to register for MATH 1111 and MATH 0999 in their next semester of enrollment.

Prerequisites: None.

Corequisites: None.

Offered: All Semesters

3. MATH 0997 Support for Quantitative Reasoning (2-1-2)

Description: This course provides an introduction to the algebraic concepts and techniques necessary for MATH 1001. This course will focus on additional support for MATH 1001 assignments and will serve as a continuation of the information covered in the MATH 1001 classroom. The topics covered include performing basic operations with rational and real numbers, representing mathematical relationships symbolically, set notation, evaluating expressions, plotting and graphing in the Cartesian coordinate system, using percentages, and solving linear equations.

Prerequisites: MATH 0987 or required scores for co-requisite remediation placement.

Corequisites: MATH 1001.

Offered: All Semesters.

4. MATH 0999 Support for College Algebra

(2-1-2)

Description: This course provides an introduction to the algebraic concepts and techniques necessary for MATH 1111. This course will focus on additional support for MATH 1111 assignments and will serve as a continuation of the information covered in the MATH 1111 classroom. The topics covered include performing basic operations with rational, real, and complex numbers, simplifying expressions, solving algebraic equations (linear, quadratic, polynomial, exponential, logarithmic), factoring polynomials, operating with rational and radical expressions and equations. Appropriate applications with the graphing calculator will be included. A TI-83 Plus or TI-84 graphic display calculator is required.

Prerequisite: MATH 0989 or required scores for co-requisite placement.

Corequisite: MATH 1111.

Offered: All Semesters

5. MATH 1001 Quantitative Reasoning

(3-0-3)

Description: This course emphasizes quantitative reasoning skills needed for informed citizens to understand the world around them. Topics include logic, basic probability, data analysis, and modeling from data. A TI 83 or 84 graphing calculator is required for this course. Students receiving credit for MATH 1001 cannot receive credit for MATH 1101 or 1111.

Prerequisite: MATH 0099, MATH 0987, MATH 0989 or satisfactory math scores to place into co-requisite remediation or higher.

Offered: All Semesters

6. MATH 1101 Introduction to Mathematical Modeling – eCore only

(3-0-3)

Description: This course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results. Students receiving credit for MATH 1101 cannot receive credit for MATH 1001 or 1111.

Prerequisites: Satisfactory math placement score.

Offered: All Semesters

7. MATH 1111 College Algebra

(3-0-3)

Description: This course provides an in-depth study of the properties of algebraic, exponential and logarithmic functions as needed for calculus. Emphasis is on using algebraic and graphical techniques for solving problems involving linear, quadratic, piece-wise defined, rational, polynomial, exponential, and logarithmic functions. A TI 83 or 84 graphing calculator is required. Students receiving credit for MATH 1111 cannot receive credit for MATH 1001 or MATH 1101.

Prerequisite: MATH 0099, MATH 0989 or satisfactory math scores to place into corequisite remediation or higher.

Offered: All semesters.

8. MATH 1113 Precalculus

(3-0-3)

Description: This course is an intensive study of the basic functions needed for the study of calculus. Topics include algebraic, functional, and graphical techniques for solving problems with algebraic, exponential, logarithmic, and trigonometric functions and their inverses. A TI 83 or 84 graphing calculator is required.

Prerequisite: MATH 1111 or one year of high school trigonometry and satisfactory math placement score or consent of Division Dean.

Offered: All Semesters

9. MATH 1211 Calculus I

(5-0-4)

Description: This is a beginning course in calculus. Topics include differentiation and integration of algebraic and trigonometric functions and applications of differentiation and integration. A TI 83 or 84 graphing calculator is required.

Prerequisite: MATH 1113

Offered: All Semesters

10. MATH 1401 Introduction to Statistics – eCore only

(3-0-3)

Description: The course is a course in basic statistics. Topics include descriptive statistics, probability, distributions, hypothesis testing, inferences, correlation, and regression.

Prerequisites: Math 1001 Quantitative Reasoning, Math 1101 Mathematical Modeling, Math 1111 College Algebra, or Math 1113 Precalculus.

Offered: All Semesters

11. MATH 1501 Calculus – eCore only

(4-0-4)

Description: Topics to include functions, limits, continuity, the derivative, antidifferentiation, the definite integral, and applications.

Prerequisites: Math 1113 - Pre-calculus or its equivalent.

Offered: All Semesters

12. MATH 2008 Foundations of Numbers and Operations

(3-0-3)

Description: This course is an Area F introductory mathematics course for teacher education majors. This course will emphasize the understanding and use of the major concepts of number and operations. As a general theme, strategies of problem solving will be used and discussed in the context of various topics.

Prerequisites: MATH 1001, MATH 1111, MATH 1113 or approved equivalent.

Offered: All Semesters

13. MATH 2111 Linear Algebra (3-0-3)

Description: This course concentrates on operations with vectors, matrices, systems of linear equations, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors.

Prerequisite: MATH 1211.

Offered: Fall and Spring.

14. MATH 2212 Calculus II (5-0-4)

Description: This course is a continuation of Calculus I. Topics include differentiation and integration of transcendental functions, techniques and applications of integration, improper integrals, parametric equations, sequences and series. A TI 83 or 84 calculator is required.

Prerequisite: MATH 1211.

Offered: Fall and Spring.

15. MATH 2213 Calculus III (5-0-4)

Description: Topics include vectors, the calculus of vector-valued functions, polar coordinates, spherical coordinates, function of several variables, directional derivatives, Lagrange multipliers, multiple integrals and applications of multiple integrals.

Prerequisite: MATH 2212.

Offered: Fall and Spring.

16. MATH 2411 Introduction to Statistics (3-0-3)

Description: This is an elementary course in descriptive and inferential statistics. Areas covered include frequency distributions, graphing techniques, the normal distribution, descriptive measures, probability, hypothesis testing, correlation, linear regression, and confidence intervals. A TI 83 or 84 graphing calculator is required.

Prerequisites: MATH 1001, MATH 1111, MATH 1113 or consent of Division Dean.

Offered: All semesters.

14. Recommends that the following course names and course descriptions to be used for the new ASU:

- **CSCI 1201: Intro. to Computer Science (3 – 0 – 3)**

Description: This course covers an introduction to the field of Computer Science and is required for all Computer Science majors. Topics to be covered include data representation, hardware, software, problem solving and algorithm design, an overview

of operating systems.

Prerequisites: READ 0989 or satisfactory English scores to place into corequisite remediation or higher. MATH 0987, MATH 0989 or satisfactory math scores to place into co-requisite remediation or higher.

Note: CSCI 1201 is not a core class.

- **CSCI 1300: Survey of Computing (3 – 0 – 3)**

Description: This class provides a foundation in major computing topics such as (but not limited to) computer architecture and operating systems, networks including the Internet, numbering systems, data representation, file structures and software engineering. An introduction to systems analysis, design and implementation is included via hand-on programming projects.

Prerequisites: MATH 1001, MATH 1111 or placement into MATH 1113 or higher.

Note: CSCI 1300 is a core class (Area D); as per recommendation by respective OWG.

Explanation for CSCI 1201/1300: Currently, ASU uses CSCI 1201 as a prerequisite for CSCI 1301 and enrollment is reserved for computer science majors only; whereas Darton uses CSCI 1300 as a common core elective available to all students. Upon review the purpose and use of each class is still necessary and the committee recommends they both remain available as indicated above.

- **CSCI 1301: Computer Science I (4 – 0 – 4)**

Description: This course includes an overview of computers and programming; problem solving and algorithm development; simple data types; arithmetic and logic operators; selection structures; repetition structures; text files; arrays (one and two dimensional); procedural abstraction and software design; modular programming (including subprograms or the equivalent).

Prerequisites: CSCI 1201 – Intro. to Computer Science

Note: CSCI is not a core class.

- **CSCI 1302: Computer Science II (4 – 0 – 4)**

Description: This course includes an overview of abstract data types (ADTs); arrays (multi-dimensional) and records; sets and strings; binary files; searching and sorting; introductory algorithm analysis (including Big-O); recursion; pointers and linked lists; software engineering concepts; dynamic data structures (stacks, queues, trees).

Prerequisites: CSCI 1301 – Computer Science I

Note: CSCI 1302 is not a core class.

Explanation of CSCI 1301/1302: The committee decided to retain the current ASU 3 course sequence for all computer science majors, including the lecture – lab – credit hours. However, the descriptions for each class have been updated to match the descriptions set by the BoR (found at

www.usg.edu/academic_affairs_handbook/section2/C738/ subsection 2.4.10: Common Course Prefixes, Numbers and Descriptions).

- **CSCI 1150: Computer Programming in Visual Basic (3 – 0 – 3)**

This is a course which presents the fundamentals of programming with Visual BASIC. Topics covered will include problem solving, program development, data types, subroutines, control structures for selection and loops, file processing, arrays, functions, strings and graphics.

Prerequisites: MATH 1001, MATH 1111 or placement into MATH 1113 or higher.

Note: CSCI 1150 is a core class (area D), as per recommendation by respective OWG.

- **CSCI 2211 Visual BASIC Programming (3 – 0 – 3)**

Description: This is a course which presents the fundamentals of programming with Visual BASIC controls, object types, events and methods. Topics include creating user interface, setting properties, designing class modules, introduction of Visual BASIC front-end applications for database. CSCI 2211 is designed for computer science majors only.

Prerequisites: CSCI 1301 – Computer Science I

Note: CSCI 2211 is not a core class.

Explanation of CSCI 1150/2211: Both campuses had a visual basic course available; however, upon review it was determined that the courses were designed with two different purposes and for different target audiences. The current ASU course (CSCI 2211) is to be retained for those pursuing a degree in Computer Science and may not be used as a core class. The current DSC course (CSCI 1150) was designed as a survey course in Visual BASIC for all majors and meets the BoR requirements for area D. Due to this distinction of the courses, the committee recommends the new ASU retains both options to best serve our students.