

LSH 491 - Special Topics

Credits: 1 TO 9. (R-9) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

LSH 492 - Independent Study

Credits: 1 TO 9. (R-9) Offered intermittently. Course material appropriate to the needs and objectives of the individual student.

LSH 494 - Seminar/Workshop

Credits: 3. (R-9) Offered intermittently. Concentrated studies in specific genres and periods.

LSH 498 - Coop Education/Internship

Credits: 1 TO 6. Offered intermittently. Prereq., consent of director. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation. Course Attributes: Internships/Practicums

Religious Studies

RLST 104 - Introduction to the Bible

Credits: 3. This course offers an introduction to the modern study of the Bible, including both the Hebrew Bible (Old Testament) and the New Testament. It assumes no prior knowledge of religion, the Bible, Judaism or Christianity. The goal of the course is to understand the Bible's literary structures and themes and its ancient historical contexts. It will approach the Bible from comparative, historical, literary, anthropological and archeological perspectives to illuminate the world of its authors.

RLST 191 - Special Topics

Credits: 1 TO 9. (R-9) Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

RLST 198 - Internship

Credits: 1 TO 6. (R-6) Prereq., consent of faculty supervisor and the Internship Services office. Extended classroom experience which provides practical application of classroom learning during placements off campus. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation. Course Attributes: Internships/Practicums

RLST 204H - Intro to the Hebrew Bible

Credits: 3. An introduction to the history, religion, and literature of ancient Israel and to modern methods in Hebrew Bible (Old Testament) studies. Includes an introduction to the history and religions of ancient West Asia. Course Attributes: Historical & Cultural Course

RLST 205 - Introduction to New Testament

Credits: 3. An introduction to the history, religion, and literature of earliest Christianity and to modern methods in New Testament studies. Includes an introduction to the history and religions of the ancient Mediterranean.

RLST 221 - Judaism

Credits: 3. An introduction to Judaism as a religion and to the history of Jewish peoples (in Asia, Africa, Europe, and the Americas) from antiquity to modernity.

RLST 225 - Christianity

Credits: 3. Introduction to the historical development of Christian thought and practice in the cultures of late antiquity and the medieval and the modern periods.

RLST 232H - Buddhism

Credits: 3. A historical introduction to the development of Buddhist thought and practice in the cultures of Asia and the West. Course Attributes: Historical & Cultural Course Indigenous and Global

RLST 234X - Hindu Religious Traditions

Credits: 3. Same as SSEA and LS 365. Critical exploration of selected aspects of Hindu thought, narrative and practice, both in contemporary and historical perspective. Focus primarily on India, but with consideration of Hinduism's transformation and impact beyond South Asia. Course Attributes: Indigenous and Global

RLST 236 - Chinese Religions

Credits: 3. An exploration of the development of thought and practice in and the interactions between the major religious movements of Chinese religion: Confucianism, Taoism, Buddhism, and folk religion/animism. Course

Attributes: Indigenous and Global

RLST 281E - Comparative Ethics

Credits: 3. An examination of central theological teachings and modes of ethical reasoning of major religious traditions models from the East and West. Course Attributes: Ethical & Human Values Course

RLST 291 - Special Topics

Credits: 1 TO 9. (R-9) Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

RLST 300 - Theory & Method Study of Relig

Credits: 3. A survey of modern theories and methods in the study of religion. Overview of sociological, anthropological, psychological, phenomenological, comparative, cognitive, and other approaches to the question, What is religion?

RLST 310 - Topics in Biblical Studies

Credits: 3. (R-6) Selected topics in modern Hebrew Bible (Old Testament) and New Testament studies. Focus on history, literature, and religions of ancient West Asia, the Mediterranean and North Africa. Topics vary from year to year and include: Israelite religion; prophets and prophecy; biblical history and historiography; ancient Gospels; the letters and communities of Paul; early biblical interpretation; archaeology and iconography of ancient religions; religion and politics in the Bible.

RLST 320 - Anct Judaism & Early Christnty

Credits: 3. (R6) Survey of the history and literature of ancient Judaism and early Christianity. Topics include: the emergence of Judaism and Christianity in the Persian, Greek, and Roman empires; religions of ancient West Asia and the Mediterranean; stories of Jewish and Christian origins; the historical Jesus; the early rabbinic movement; the Dead Sea Scrolls; Paul between Judaism and Christianity.

RLST 335 - Western Religious Thought I

Credits: 3. Selected studies in the intellectual history of western religions, alternating between studies of periods and seminal thinkers. Emphasis will be on the ancient and medieval periods.

RLST 336 - Western Religious Thought II

Credits: 3. Selected studies in the intellectual history of western religions, alternating between studies of periods and seminal thinkers. Emphasis will be on the late medieval and early modern periods.

RLST 353 - Topics in South Asia Religions

Credits: 3. (R-6) This course will examine select topics of central importance with respect to the history of interaction between the major religions (Hinduism, Islam, Buddhism, Jainism, Sikhism) of South Asia.

RLST 354 - Topics in East Asia Religions

Credits: 3. (R-6) This course will examine select topics of central importance with respect to the history of interaction between the major religions (Confucianism, Taoism, Buddhism, and folk animism and shamanism) of East Asia.

RLST 366 - Tibetan Civilization

Credits: 3. An exploration of the history and culture of a unique civilization that has influenced greatly the cultures of Himalayan, East, and South Asia. Special attention will be given to Tibetan religions, but these will be explored within the context of the society's political, social, economic, and other cultural developments.

RLST 368 - Contemporary Buddhism S/SEAsia

Credits: 3. As with other major religions, modernity and globalization have presented profound challenges to Buddhist traditions. In this course we will explore various contemporary issues that have affected Theravada Buddhist societies--colonial and post-colonial revivalism, religious nationalism, women's rights and social reform--as case studies in some of the major ways in which religions have confronted modernity.

RLST 369 - Contemplative Traditions Asia

Credits: 3. An exploration of the rich and diverse approaches to mental transformation and cultivation of gnosis as developed by several of Asia's major religious traditions, such as Buddhism, Jainism, Hinduism, Taoism, and Confucianism.

RLST 370 - Mysticism

Credits: 3. (R-6) An inquiry into the literature and interpretation of mysticism in the major religious traditions. Each offering will focus on a specific tradition or period.

RLST 376 - Contemporary Religious Thought

Credits: 3. (R-6) Study of selected major critical and constructive proposals in modern religious thought in various traditions.

RLST 391 - Special Topics

Credits: 1 TO 12. (R-12) Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

RLST 392 - Independent Study

Credits: 1 TO 6. (R-6) Course material appropriate to the needs and objectives of the individual student.

RLST 491 - Special Topics

Credits: 1 TO 12. (R-12) Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

RLST 492 - Independent Study

Credits: 1 TO 9. (R-9) Prereq., consent of instr. Work on selected problems by individual students under direct faculty supervision.

Mathematical Sciences Department

Emily Stone, Chair

Mathematics is studied both as a tool and for its own sake. Its usefulness in the sciences - physical, biological, social, behavioral, and environmental - and in decision-making processes is so established that it is an indispensable part of many curricula.

Mathematics is chosen as a major area of study by individuals who find it challenging, fascinating, and beautiful. It is also appreciated by many who seek primarily to use mathematics as a tool.

A career in mathematics, except for teaching at the secondary level, generally requires a graduate degree as preparation. Careers include teaching, research, and the application of mathematics to diverse problems in institutions of higher learning, business, industry, and government.

The Bachelor of Arts, Master of Arts, and Doctor of Philosophy degrees are offered as well as a Bachelor of Science in Mathematical Sciences–Computer Science.

High School Preparation: For studying mathematics at the University level, it is recommended that the high school course work consist of four years of college-preparatory mathematics, including geometry, trigonometry, and college algebra or precalculus. A course in calculus or statistics is helpful, but not necessary. It is unusual to complete an undergraduate degree in mathematics in four years without the necessary background to take Calculus I (M 171) during the freshman year (preferably during the first semester at the university).

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Science Level: Major Subject: **Computer Sci-Mathematical Sci**

Total Credits: 73 Cumulative GPA Required: 2.0

The purpose of the combined program is to provide a thorough background in both allied disciplines and to inculcate a deeper understanding of their goals and methods. A student must complete 60 credits in the two disciplines: 30 of these credits in Computer Science courses and 30 of these credits in Mathematical Sciences courses. Each student plans a program in consultation with both a Computer Science and a Mathematical

Sciences advisor. Students planning to attend graduate school in computer science or the mathematical sciences should consult with their respective advisors.

Category Name: Mathematical Sciences Rule: Complete the following subcategories.

Criterion: Number of Credits 31

Course Listing Commentary:

Subcategory Name: Mathematical Sciences Core Rule: Complete all of the following courses.

Criterion: C- Number of Credits 19

Course Listing

M 171	Calculus I	4	F,S
M 172	Calculus II	4	F,S
M 221	Introduction to Linear Algebra	4	F,S
M 273	Multivariable Calculus	4	F,S
M 307	Intro to Abstract Mathematics	3	F,S

Commentary: The following substitutions are allowed: M 181 for M 171, M 182 for M 172, and M 225 for M 307.

Subcategory Name: Mathematical Sciences Electives Rule: Complete 12 credits from the following courses.

Criterion: C- Number of Credits 12

Course Listing

M 311	Ordinary Diff Equations/System	3	F
M 325	Discrete Mathematics	3	
M 326	Number Theory	3	S
M 361	Discrete Optimization	3	S
M 362	Linear Optimization	3	F
M 381	Advanced Calculus I	3	F
M 412	Partial Differential Equations	3	S
M 414	Deterministic Models	3	
M 429	History of Mathematics	3	S
M 431	Abstract Algebra I	4	F
M 432	Abstract Algebra II	4	S
M 439	Euclidean & Non-Euclidean Geo	3	F
M 440	Numerical Analysis	4	I
M 445	Stat/Math/Comp Modeling	4	FO
M 461	Practical Big Data Analytics	3	
M 462	Theoretical Big Data Analytics	3	
M 485	Graph Theory	3	F
STAT 341	Intro to Probability and Stat	3	F,S
STAT 421	Probability Theory	3	F
STAT 422	Mathematical Statistics	3	S
STAT 451	Statistical Methods I	3	F
STAT 452	Statistical Methods II	3	S

Commentary: The combined nine credits of Computer Science Electives and twelve credits of Mathematical Sciences Electives must include at least three 3- or 4-credit courses numbered 400 or above, with at least one chosen from each department (not including M 429 and STAT 451, 452).

Commentary: Lower Division Core

Category Name: Computer Science

Rule: Complete the following subcategories.

Criterion: Number of Credits 30

Course Listing Commentary:

Subcategory Name: Computer Science Core Rule: Complete all of the following courses.

Criterion: C- Number of Credits 21

Course Listing

CSCI 106	Careers in Computer Science	1	F
CSCI 135	Fund of Computer Science I	3	F,S
CSCI 136	Fund of Computer Science II	3	F,S
CSCI 205	Programming Languages w/ C/C++	4	
CSCI 232	Data Structures and Algorithms	4	F
CSCI 332	Design/Analysis of Algorithms	3	S
CSCI 361	Computer Architecture	3	S

Subcategory Name: Computer Science Electives Rule: Complete 9 credits from the following courses.

Criterion: C- Number of Credits 9

Course Listing

CSCI 315E	Computers, Ethics, and Society	3	F
CSCI 323	Software Science	3	F
CSCI 340	Database Design	3	S
CSCI 392	Independent Study	1 To 6	F,S
CSCI 394	Seminar	1 To 6	
CSCI 398	Internship	1 To 3	F,S
CSCI 411	Advanced Web Programming	3	
CSCI 412	Game and Mobile App	3	
CSCI 426	Adv Prgrmg Theory/Practice I	3	F
CSCI 427	Adv Prgrmg Theory/Practice II	3	S
CSCI 438	Theory of Computation	3	
CSCI 441	Computer Graphics Programming	3	I
CSCI 443	User Interface Design	3	S
CSCI 444	Data Visualization	3	F
CSCI 446	Artificial Intelligence	3	I
CSCI 447	Machine Learning	3	S
CSCI 448	Pattern Recognition	3	I
CSCI 451	Computational Biology	3	F
CSCI 460	Operating Systems	3	F
CSCI 464	Applications Mining Big Data	3	
CSCI 466	Networks	3	S
CSCI 473	Cryptography	3	
CSCI 477	Simulation	3	S
CSCI 478	Multimedia Data Processing	3	
CSCI 480	Parallel Computing	3	

CSCI 490	Research	1 To 6
CSCI 491	Special Topics	1 To 6
CSCI 492	Independent Study	1 To 6
CSCI 494	Seminar	1 To 6
CSCI 498	Internship	1 To 3 F
CSCI 499	Senior Thesis/Capstone	1 To 6 S

Commentary: (1) A total of at most three of the nine credits of Computer Science Electives may be in CSCI 398 or 498.

(2) The combined nine credits of Computer Science Electives and twelve credits of Mathematical Sciences Electives must include at least three 3- or 4-credit courses numbered 400 or above, with at least one chosen from each department (not including M 429 and STAT 451, 452).

Commentary: Lower Division Core

Criterion: Number of Credits 9-10

Course Listing Commentary:

Subcategory Name: Biology

Rule: If you choose biology, complete all of the following courses.

Criterion: C- Number of Credits 9

Course Listing

BIOB 160N	Principles of Living Systems	4	F, SU
BIOB 170N	Princpls Biological Diversity	3	S, SU
BIOB 171N	Princpls Biological Dvrsty Lab	2	S, SU

Subcategory Name: Chemistry

Rule: If you choose chemistry, complete all of the following courses.

Criterion: C- Number of Credits 10

Course Listing

CHMY 141N	College Chemistry I	5	F, S
CHMY 143N	College Chemistry II	5	S, SU

Subcategory Name: Physics

Rule: If you choose physics, complete all of the following courses.

Criterion: C-

Course Listing Number of Credits 10

PHSX 215N	Fund of Physics w/Calc I	4	F
PHSX 216N	Physics Laboratory I w/Calc	1	F
PHSX 217N	Fund of Physics w/Calc II	4	S
PHSX 218N	Physics Laboratory II w/Calc	1	S

Commentary: Lower Division Core

Category Name: Public Speaking Requirement Rule: Complete 1 of the following courses.

Criterion: C- Number of Credits 3

Course Listing

COMX 111A	Intro to Public Speaking	3	F, S
COMX 242	Argumentation	3	F, S

Upper Division Writing

Category Name: Advanced College Writing Requirement Rule: Complete 1 of the following courses.

Criterion: C- Number of Credits 3

Course Listing

CSCI 315E Computers, Ethics, and Society 3

CSCI 499 Senior Thesis/Capstone 1 To 6

M 429 History of Mathematics 3

M 499 Senior Thesis 1 To 12

Commentary: Any other approved Advanced College Writing course will also fulfill this requirement.

Commentary: Additional Requirements

Category Name: Suggested Curricula

Commentary: Students are encouraged to choose their Computer Science and Mathematical Sciences Electives according to one of the following curricula; these tracks are suggestions only and, as such, optional.

Applied Math–Scientific Programming: M 311, 412, 414, and one course chosen from M 381, 440, 472, 473 and STAT 341. Three courses chosen from CSCI 441, 444, 460, 477.

Combinatorics and Optimization–Artificial Intelligence: M 361, 362, and two courses chosen from M 325, 414, 485 and STAT 341; and CSCI 446, 447, and 460.

Statistics–Machine Learning: STAT 341, 421, and two courses chosen from M 325, 362, 485 and STAT 422. Three courses chosen from CSCI 340, 444, 446, 447, and 451.

Algebra–Analysis: M 381, 431, and two courses chosen from M 326, 432, 472, 473; CSCI 426, 460, and one other course.

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Arts Level: **Major** Subject: **Mathematics**

Total Credits: 67 Cumulative GPA Required: 2.0

This degree is the BA in Mathematics without an option. Students can add one or more of the options in Applied Mathematics, Combinatorics & Optimization, Pure Mathematics, or Statistics to this degree by fulfilling the respective Option Requirements (achieved by taking specific Upper-Division Elective Courses). Typically, students declare one of these four options during their sophomore or junior year. Note that the requirements for the Mathematics Education option are extensive and differ substantially from the requirements for the other options. Students interested in Mathematics Education are encouraged to declare this option as early as possible, preferably during their first year at UM.

Lower Division Core

Category Name: Mathematics Core Courses Rule:

Criterion: C- Number of Credits 23

Course Listing Commentary:

Subcategory Name: Calculus I

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 171 Calculus I 4 F,S

M 181 Honors Calculus I 4 F

Subcategory Name: Calculus II

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Subcategory Name: Other Mathematics Core Courses Rule: Take all of the following courses.

Criterion: C- Number of Credits 15

Course Listing

M 210 Intro to Mathematical Software 3 S

M 221 Introduction to Linear Algebra 4 F,S

M 273 Multivariable Calculus 4 F,S

M 300 Undergraduate Mathematics Sem 1 F,S

M 307 Intro to Abstract Mathematics 3 F,S

Major Electives

Category Name: Upper-Division Mathematics Requirement Rule: Take 23 credits in this category.

Criterion: C- Number of Credits 23

Course Listing

Commentary: (1) Students completing a minor (in another subject) need take only 20 credits.

(2) Students completing a second major need take only 18 credits.

Subcategory Name: Upper-Division Elective Courses

Rule: Take 7 courses from the following list; at least 3 of them must be at the 400 level. Criterion: C- Number of Credits 21 or more

Course Listing

M 301 Math Technology for Teachers 3 F

M 311 Ordinary Diff Equations/System 3 F

M 325 Discrete Mathematics 3

M 326 Number Theory 3 S

M 361 Discrete Optimization 3 S

M 362 Linear Optimization 3 F

M 381 Advanced Calculus I 3 F

M 412 Partial Differential Equations 3 S

M 414 Deterministic Models 3

M 429 History of Mathematics 3 S

M 431 Abstract Algebra I 4 F

M 432 Abstract Algebra II 4 S

M 439 Euclidean & Non-Euclidean Geo 3 F

M 440 Numerical Analysis 4 I

M 445 Stat/Math/Comp Modeling 4 FO

M 461 Practical Big Data Analytics 3

M 462 Theoretical Big Data Analytics 3

M 472 Intro to Complex Analysis 4 S

M 473 Introduction to Real Analysis 4 FO

M 485 Graph Theory 3 F

STAT 341 Intro to Probability and Stat 3 F,S

STAT 421 Probability Theory 3 F

STAT 422 Mathematical Statistics3 S

STAT 452 Statistical Methods II 3 S

Commentary: (1) Students completing a minor (in another subject) or a second major need take only 6 courses (totaling 18 credits or more).

Subcategory Name: Upper-Division Elective Computer Labs

Rule: Computer labs from the following list are optional; if taken, they count toward the total number of credits required for the Upper-Division Mathematics Requirement.

Criterion: C- Number of Credits 0-5

Course Listing

M 317 ODE Computer Lab 1 F

M 363 Linear Optimization Lab 1 F

M 418 PDE Computer Lab 1 S

STAT 457 Computer Data Analysis I 1 F

STAT 458 Computer Data Analysis II 1 S

Commentary: Cognates

Category Name: Science Requirement

Rule: Take 18 credits in at most 3 areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), economics (ECNS), forestry (FORS, WILD), geosciences (GEO), management information systems (BMIS), and physics (PHSX).

Criterion: C- Number of Credits 18

Course Listing

Commentary: (1) Students completing a minor (in another subject) or a second major are exempt from this requirement.

(2) Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Commentary:

Upper Division Writing

Category Name: Advanced College Writing Requirement

Rule: Take 1 of the following 2 courses, or any other approved Advanced College Writing course. Criterion: C- Number of Credits 3

Course Listing

M 429 History of Mathematics3 S

M 499 Senior Thesis 1 To 12

Commentary: Additional Requirements

(2) In addition, a cumulative GPA of 2.0 is required for all mathematical sciences courses used to fulfill major requirements. (Mathematical sciences courses are those with a prefix of M or STAT.)

Other Courses

Category Name: Foreign Language/Computer Science Requirement

Rule: Either complete the General Education Requirement Group III: Modern and Classical Language (not the symbolic systems exception), or take one course from the following list.

Criterion: C-

Course Listing Number of Credits 3

CSCI 100	Intro to Programming	3	F,S
CSCI 135	Fund of Computer Science I	3	F,S
CSCI 136	Fund of Computer Science II	3	F,S
CSCI 250	Computer Mding/Science Majors	3	F

Commentary: Students completing a second major are exempt from this requirement.

Degree Commentary: The degree specific credits are much lower for double-majors and for students completing an additional minor (in another subject): 41 credits for students completing a second major, and 46 credits for students completing a minor.

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Arts Level: **Major** Subject: **Mathematics** Option: **Applied Mathematics**

Total Credits: 67 Cumulative GPA Required: 2.0

This degree option differs from the BA in Mathematics without an option only in the Option Requirements.

Lower Division Core

Category Name: Mathematics Core Courses Rule:

Criterion: C- Number of Credits 23

Course Listing Commentary:

Subcategory Name: Calculus I

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 171 Calculus I 4 F,S

M 181 Honors Calculus I 4 F

Subcategory Name: Calculus II

Rule: Take 1 of the following 2 courses.

Course Listing

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Subcategory Name: Other Mathematics Core Courses Rule: Take all of the following courses.

Criterion: C- Number of Credits 15

Course Listing

M 210 Intro to Mathematical Software 3 S

M 221 Introduction to Linear Algebra 4 F,S

M 273 Multivariable Calculus 4 F,S

M 300 Undergraduate Mathematics Sem 1 F,S

M 307 Intro to Abstract Mathematics 3 F,S

Major Electives

Category Name: Upper-Division Mathematics Requirement Rule: Take 23 credits in this category.

Criterion: C- Number of Credits 23

Course Listing

Commentary: (1) Students completing a minor (in another subject) need take only 20 credits.

(2) Students completing a second major need take only 18 credits.

Subcategory Name: Upper-Division Elective Courses

Rule: Take 7 courses from the following list; at least 3 of them must be at the 400 level. Criterion: C- Number of Credits 21 or more

Course Listing

M 301	Math Technology for Teachers	3	F	
M 311	Ordinary Diff Equations/System	3	F	
M 325	Discrete Mathematics	3		
M 326	Number Theory	3	S	
M 361	Discrete Optimization	3	S	
M 362	Linear Optimization	3	F	
M 381	Advanced Calculus I	3	F	
M 412	Partial Differential Equations	3	S	
M 414	Deterministic Models	3		
M 431	Abstract Algebra I	4	F	
M 432	Abstract Algebra II	4	S	
M 439	Euclidean & Non-Euclidean Geo	3	F	
M 440	Numerical Analysis	4	I	
M 445	Stat/Math/Comp Modeling	4	FO	
M 461	Practical Big Data Analytics	3		
M 462	Theoretical Big Data Analytics	3		
M 472	Intro to Complex Analysis	4	S	
M 473	Introduction to Real Analysis	4	FO	
M 485	Graph Theory	3	F	
STAT 341	Intro to Probability and Stat	3	F,S	
STAT 421	Probability Theory	3	F	
STAT 422	Mathematical Statistics	3	S	
STAT 452	Statistical Methods II	3	S	

Commentary: (1) Students completing a minor (in another subject) or a second major need take only 6 courses (totaling 18 credits or more).

(2) Residency Requirement: At least 4 of the courses in this category must be taken at UM-Missoula (only 3 if M 307 is taken at UM-Missoula).

(3) Note that STAT 451 does not count toward this requirement.

Subcategory Name: Upper-Division Elective Computer Labs

Rule: Computer labs from the following list are optional; if taken, they count toward the total number of credits required for the Upper-Division Mathematics Requirement.

Criterion: C- Number of Credits 0-5

Course Listing

M 317	ODE Computer Lab	1	F	
M 363	Linear Optimization Lab	1	F	
M 418	PDE Computer Lab	1	S	
STAT 457	Computer Data Analysis I	1	F	
STAT 458	Computer Data Analysis II	1	S	

Commentary: Cognates

Category Name: Science Requirement

Rule: Take 18 credits in at most 3 areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), economics (ECNS), forestry (FORS, WILD), geosciences (GEO), management information systems (BMIS), and physics (PHSX).

Criterion: C- Number of Credits 18

Course Listing

Commentary: (1) Students completing a minor (in another subject) or a second major are exempt from this requirement. (2) Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Upper Division Writing

Category Name: Advanced College Writing Requirement

Rule: Take 1 of the following 2 courses, or any other approved Advanced College Writing course. Criterion: C- Number of Credits 3

Course Listing

M 429 History of Mathematics 3 S

M 499 Senior Thesis 1 To 12

Additional Requirements

Category Name: GPA Requirement

Commentary: (1) A cumulative GPA of 2.0 is required for all courses used to fulfill major requirements. (2) In addition, a cumulative GPA of 2.0 is required for all mathematical sciences courses used to fulfill major requirements. (Mathematical sciences courses are those with a prefix of M or STAT.)

Other Courses

Category Name: Foreign Language/Computer Science Requirement

Rule: Either complete the General Education Requirement "Group III: Modern and Classical Language" (not the symbolic systems exception), or take one course from the following list.

Criterion: C-

Course Listing Number of Credits 3

CSCI 100 Intro to Programming 3 F,S

CSCI 135 Fund of Computer Science I 3 F,S

CSCI 136 Fund of Computer Science II 3 F,S

CSCI 250 Computer Mdlng/Science Majors 3 F

Commentary: Students completing a second major are exempt from this requirement.

Commentary: Option Requirements

Category Name: Requirements for the Applied Mathematics Option Rule: Complete the following subcategories

Criterion: C- Number of Credits 13

Course Listing Commentary:

Subcategory Name: Applied Mathematics Option: Core Courses Rule: Take all of the following courses.

Criterion: C- Number of Credits 9

Course Listing

M 311 Ordinary Diff Equations/System 3 F

M 412 Partial Differential Equations 3 S

M 414 Deterministic Models 3

Subcategory Name: Applied Mathematics Option: Elective Courses Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 440 Numerical Analysis 4 I

M 472 Intro to Complex Analysis 4 S

Commentary: In addition, M 381 and 485 are also recommended.

Degree Commentary: The degree specific credits are much lower for double-majors and for students completing an additional minor (in another subject): 42 credits for students completing a second major, and 46 credits for students completing a minor during the freshman year (preferably during the first semester at the university).

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Arts Level: Major Subject: **Mathematics** Option: **Combinatorics & Optimization**

Total Credits: 67 Cumulative GPA Required: 2.0

his degree option differs from the BA in Mathematics without an option only in the Option Requirements.

Lower Division Core

Category Name: Mathematics Core Courses Rule:

Criterion: C- Number of Credits 23

Course Listing Commentary:

Subcategory Name: Calculus I

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 171 Calculus I 4 F,S

M 181 Honors Calculus I 4 F

Subcategory Name: Calculus II

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Subcategory Name: Other Mathematics Core Courses Rule: Take all of the following courses.

Criterion: C- Number of Credits 15

Course Listing

M 210 Intro to Mathematical Software 3 S

M 221 Introduction to Linear Algebra 4 F,S

M 273 Multivariable Calculus 4 F,S

M 300 Undergraduate Mathematics Sem 1 F,S

M 307 Intro to Abstract Mathematics 3 F,S

Major Electives

Category Name: Upper-Division Mathematics Requirement Rule: Take 23 credits in this category.

Criterion: C- Number of Credits 23

Course Listing

Commentary: (1) Students completing a minor (in another subject) need take only 20 credits.

(2) Students completing a second major need take only 18 credits.

Subcategory Name: Upper-Division Elective Courses

Rule: Take 7 courses from the following list; at least 3 of them must be at the 400 level. Criterion: C- Number of Credits 21 or more

Course Listing

M 301	Math Technology for Teachers	3	F	
M 311	Ordinary Diff Equations/System	3	F	
M 325	Discrete Mathematics	3		
M 326	Number Theory	3	S	
M 361	Discrete Optimization	3	S	
M 362	Linear Optimization	3	F	
M 381	Advanced Calculus I	3	F	
M 412	Partial Differential Equations	3	S	
M 414	Deterministic Models	3		
M 429	History of Mathematics	3	S	
M 431	Abstract Algebra I	4	F	
M 432	Abstract Algebra II	4	S	
M 439	Euclidean & Non-Euclidean Geo	3	F	
M 440	Numerical Analysis	4	I	
M 445	Stat/Math/Comp Modeling	4	FO	
M 461	Practical Big Data Analytics	3		
M 462	Theoretical Big Data Analytics	3		
M 472	Intro to Complex Analysis	4	S	
M 473	Introduction to Real Analysis	4	FO	
M 485	Graph Theory	3	F	
STAT 421	Probability Theory	3	F	
STAT 422	Mathematical Statistics	3	S	
STAT 452	Statistical Methods II	3	S	

Commentary: (1) Students completing a minor (in another subject) or a second major need take only 6 courses (totaling 18 credits or more).

(2) Residency Requirement: At least 4 of the courses in this category must be taken at UM-Missoula (only 3 if M 307 is taken at UM-Missoula).

(3) Note that STAT 451 does not count toward this requirement.

Subcategory Name: Upper-Division Elective Computer Labs

Rule: Computer labs from the following list are optional; if taken, they count toward the total number of credits required for the Upper-Division Mathematics Requirement.

Criterion: C- Number of Credits 0-5

Course Listing

M 317	ODE Computer Lab	1	F	
M 363	Linear Optimization Lab	1	F	
M 418	PDE Computer Lab	1	S	
STAT 457	Computer Data Analysis I	1	F	
STAT 458	Computer Data Analysis II	1	S	

Commentary: Cognates

Category Name: Science Requirement

Rule: Take 18 credits in at most 3 areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), economics (ECNS), forestry (FORS, WILD), geosciences (GEO), management information systems (BMIS), and physics (PHSX).

Criterion: C- Number of Credits 18

Course Listing

Commentary: (1) Students completing a minor (in another subject) or a second major are exempt from this requirement.

(2) Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Upper Division Writing

Category Name: Advanced College Writing Requirement

Rule: Take 1 of the following 2 courses, or any other approved Advanced College Writing course. Criterion: C- Number of Credits 3

Course Listing

M 429 History of Mathematics 3 S

M 499 Senior Thesis 1 To 12

Additional Requirements

Category Name: GPA Requirement

Commentary: (1) A cumulative GPA of 2.0 is required for all courses used to fulfill major requirements.

(2) In addition, a cumulative GPA of 2.0 is required for all mathematical sciences courses used to fulfill major requirements. (Mathematical sciences courses are those with a prefix of M or STAT.)

Other Courses

Category Name: Foreign Language/Computer Science Requirement

Rule: Either complete the General Education Requirement "Group III: Modern and Classical Language" (not the symbolic systems exception), or take one course from the following list.

Criterion: C-

Course Listing Number of Credits 3

CSCI 100 Intro to Programming 3 F,S

CSCI 135 Fund of Computer Science I 3 F,S

CSCI 136 Fund of Computer Science II 3 F,S

CSCI 250 Computer Mdlng/Science Majors 3 F

Commentary: Students completing a second major are exempt from this requirement.

Commentary: Option Requirements

Category Name: Requirements for the Combinatorics & Optimization Option Rule:

Criterion: C- Number of Credits 12-13

Course Listing Commentary:

Subcategory Name: Combinatorics & Optimization Option: Core Courses Rule: Take all of the following courses.

Criterion: C- Number of Credits 9

Course Listing

M 361 Discrete Optimization 3 S

M 362 Linear Optimization 3 F

M 485 Graph Theory 3 F

Subcategory Name: Combinatorics & Optimization Option: Elective Courses Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 3-4

CSCI 332 Design/Analysis of Algorithms 3 S

M 414 Deterministic Models 3

M 440 Numerical Analysis 4 I

STAT 341 Intro to Probability and Stat 3 F,S

Degree Commentary: The degree specific credits are much lower for double-majors and for students completing an additional minor (in another subject): 41 credits for students completing a second major, and 46 credits for students completing a minor.

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Arts Level: Major Subject: **Mathematics**

Option: **Mathematics Education**

Total Credits: 53 Cumulative GPA Required: 2.5

Individuals interested in teaching in K-12 schools must complete a degree in the content area they want to teach plus the teacher preparation program through the Department of Curriculum and Instruction. Individuals must complete the teaching major/teaching track within that degree program, which may contain different course requirements than the academic major since the sequence of courses is designed to meet state standards. Upon completion of the degree program with the teaching track and the secondary licensure program, one will be eligible for a standard Montana teaching license in this content area.

Lower Division Core

Category Name: Mathematical Sciences Courses Required for the Mathematics Education Option Rule: The courses in this category must be completed with a cumulative GPA of at least 2.75.

Criterion: C- Number of Credits 41-42

Course Listing Commentary:

Subcategory Name: Calculus I

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 171 Calculus I 4 F,S

M 181 Honors Calculus I 4 F

Subcategory Name: Calculus II

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Subcategory Name: Other Mathematical Sciences Core Courses for the Mathematics Education Option Rule:

Take all of the following courses.

Criterion: C- Number of Credits 26

Course Listing

M 221 Introduction to Linear Algebra 4 F,S

M 301	Math Technology for Teachers	3	F
M 307	Intro to Abstract Mathematics	3	F,S
M 326	Number Theory	3	S
M 429	History of Mathematics	3	S
M 431	Abstract Algebra I	4	F
M 439	Euclidean & Non-Euclidean Geo	3	F
STAT 341	Intro to Probability and Stat	3	F,S

Commentary: (1) Residency Requirement: At least 4 of the upper-division courses in this category must be taken at UM-Missoula (only 3 if the Elective Course is an upper-division course taken at UM-Missoula).

(2) Note that taking M 429 satisfies the Advanced College Writing Requirement for this degree.

(3) STAT 451 can be substituted for STAT 341, if STAT 451 is not selected as the elective course.

Subcategory Name: Elective Course Rule: Take one of the following:

Criterion: C- Number of Credits 3-4

Course Listing

M 273	Multivariable Calculus	4	F,S
M 311	Ordinary Diff Equations/System	3	F
M 325	Discrete Mathematics	3	
M 361	Discrete Optimization	3	S
M 362	Linear Optimization	3	F
M 381	Advanced Calculus I	3	F
M 412	Partial Differential Equations	3	S
M 414	Deterministic Models	3	
M 432	Abstract Algebra II	4	S
M 440	Numerical Analysis	4	I
M 445	Stat/Math/Comp Modeling	4	FO
M 461	Practical Big Data Analytics	3	
M 462	Theoretical Big Data Analytics	3	
M 472	Intro to Complex Analysis	4	S
M 473	Introduction to Real Analysis	4	FO
M 485	Graph Theory	3	F
STAT 421	Probability Theory	3	F
STAT 451	Statistical Methods I	3	
STAT 452	Statistical Methods II	3	S

Subcategory Name: Mathematics Teaching Methods Course Rule: Take the following course.

Criterion: C- Number of Credits 4

Course Listing

EDU 497	Teaching and Assessing	0 To 4
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Commentary: The course number EDU 497 covers many different teaching methods courses. The section of EDU 497 entitled "Methods: 5 - 12 Mathematics" is required for the Mathematics Education option.

Commentary: Cognates

Category Name: Science Requirement for the Mathematics Education Option

Rule: Take 12 credits in at most two areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), economics (ECNS), forestry (FORS, WILD), geosciences (GEO), management information systems (BMIS), and physics (PHSX).

Criterion: C- Number of Credits 12

Course Listing

Commentary: (1) Students completing a teaching minor (in another subject) or a second major are exempt from this requirement.

(2) Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Commentary: Additional Requirements

Category Name: Secondary Teaching Licensure

Commentary: For licensure to teach mathematics, a student must also gain admission to the Teacher Education Program and meet all the requirements for secondary teaching licensure (see the College of Education and Human Sciences).

Degree Commentary

(1) The number of degree specific credits required is significantly higher if one also counts the additional course work required by the Teacher Education Program.

(2) Note that the Teacher Education Program requires in addition an overall cumulative GPA of at least 2.75.

College Humanities & Sciences Catalog Year: 2015-2016 Degree Type: Minor Level: Minor Subject:

Mathematics Total Credits: 23 Cumulative GPA Required: 2.0

Lower Division Core

Category Name: Calculus Requirement for a Minor in Mathematics Rule: Take one of the following three courses:

Course Listing

M 162 Applied Calculus 4 F,S

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Commentary: M 172 or 182 are recommended since they are prerequisites for many upper-division mathematics courses.

Commentary: Other Courses

Category Name: Elective Courses for a Minor in Mathematics

Rule: Take 23 credits in M or STAT courses offered at UM-Missoula. M courses must be numbered 115 or higher (excluding M 118). Courses must include at least three 3- or 4-credit courses at the 300 level or above.

Criterion: C- Number of Credits 23

Course Listing

Commentary: (1) The required Calculus course (M 162, 172, or 182) counts toward the 23 credits, as well as its prerequisite courses at the 100-level (e.g., M 171 or 121).

(2) Notice to Transfer Students: Mathematical Sciences courses that are not equivalent to courses taught at UM-Missoula can often be counted toward a Minor in Mathematics. This is determined on an individual basis; please contact the Department of Mathematical Sciences for details.

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Arts Level: Major Subject: **Mathematics** Option: **Pure Mathematics**

Total Credits: 68 Cumulative GPA Required: 2.0

This degree option differs from the BA in Mathematics without an option only in the Option Requirements.

Lower Division Core

Category Name: Mathematics Core Courses Rule:

Criterion: C- Number of Credits 23

Course Listing Commentary:

Subcategory Name: Calculus I

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 171 Calculus I 4 F,S

M 181 Honors Calculus I 4 F

Subcategory Name: Calculus II

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Subcategory Name: Other Mathematics Core Courses Rule: Take all of the following courses.

Criterion: C- Number of Credits 15

Course Listing

M 210 Intro to Mathematical Software 3 S

M 221 Introduction to Linear Algebra 4 F,S

M 273 Multivariable Calculus 4 F,S

M 300 Undergraduate Mathematics Sem 1 F,S

M 307

Commentary: Intro to Abstract Mathematics 3 F,S

Major Electives

Category Name: Upper-Division Mathematics Requirement Rule: Take 23 credits in this category.

Criterion: C- Number of Credits 23

Course Listing

Commentary: (1) Students completing a minor (in another subject) need take only 20 credits.

(2) Students completing a second major need take only 18 credits.

Subcategory Name: Upper-Division Elective Courses

Rule: Take 7 courses from the following list; at least 3 of them must be at the 400 level. Criterion: C- Number of Credits 21 or more

Course Listing

M 301 Math Technology for Teachers 3 F

M 311 Ordinary Diff Equations/System 3 F

M 325 Discrete Mathematics 3

M 326 Number Theory 3 S

M 361	Discrete Optimization	3	S		
M 362	Linear Optimization	3	F		
M 412	Partial Differential Equations	3		S	
M 414	Deterministic Models	3			
M 429	History of Mathematics	3	S		
M 431	Abstract Algebra I	4	F		
M 432	Abstract Algebra II	4	S		
M 439	Euclidean & Non-Euclidean Geo	3		F	
M 440	Numerical Analysis	4	I		
M 445	Stat/Math/Comp Modeling	4		FO	
M 461	Practical Big Data Analytics	3			
M 462	Theoretical Big Data Analytics	3			
M 472	Intro to Complex Analysis	4	S		
M 473	Introduction to Real Analysis	4		FO	
M 485	Graph Theory	3	F		
STAT 341	Intro to Probability and Stat	3		F,S	
STAT 421	Probability Theory	3	F		
STAT 422	Mathematical Statistics	3	S		
STAT 452	Statistical Methods II	3	S		

Commentary: (1) Students completing a minor (in another subject) or a second major need take only 6 courses (totaling 18 credits or more).

(2) Residency Requirement: At least 4 of the courses in this category must be taken at UM-Missoula (only 3 if M 307 is taken at UM-Missoula).

(3) Note that STAT 451 does not count toward this requirement.

Subcategory Name: Upper-Division Elective Computer Labs

Rule: Computer labs from the following list are optional; if taken, they count toward the total number of credits required for the Upper-Division Mathematics Requirement.

Criterion: C- Number of Credits 0-5

Course Listing

M 317	ODE Computer Lab	1	F		
M 363	Linear Optimization Lab	1	F		
M 418	PDE Computer Lab	1	S		
STAT 457	Computer Data Analysis I	1	F		
STAT 458	Computer Data Analysis II	1	S		

Commentary: Cognates

Category Name: Science Requirement

Rule: Take 18 credits in at most 3 areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), economics

Course Listing

Commentary: (1) Students completing a minor (in another subject) or a second major are exempt from this requirement.

(2) Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Upper Division Writing

Category Name: Advanced College Writing Requirement

Rule: Take 1 of the following 2 courses, or any other approved Advanced College Writing course. Criterion: C-
Number of Credits 3

Course Listing

M 429 History of Mathematics 3 S

M 499 Senior Thesis 1 To 12

Additional Requirements

Category Name: GPA Requirement

Commentary: (1) A cumulative GPA of 2.0 is required for all courses used to fulfill major requirements.

(2) In addition, a cumulative GPA of 2.0 is required for all mathematical sciences courses used to fulfill major requirements. (Mathematical sciences courses are those with a prefix of M or STAT.)

Other Courses

Category Name: Foreign Language/Computer Science Requirement

Rule: Either complete the General Education Requirement "Group III: Modern and Classical Language" (not the symbolic systems exception), or take one course from the following list.

Criterion: C-

Course Listing Number of Credits 3

CSCI 100 Intro to Programming 3 F,S

CSCI 135 Fund of Computer Science I 3 F,S

CSCI 136 Fund of Computer Science II 3 F,S

CSCI 250 Computer Mdlng/Science Majors 3 F

Commentary: Students completing a second major are exempt from this requirement.

Commentary: Option Requirements

Category Name: Requirements for the Pure Mathematics Option

Course Listing

M 381 Advanced Calculus I 3 F

M 431 Abstract Algebra I 4 F

M 432 Abstract Algebra II 4 S

M 472 Intro to Complex Analysis 4 S

M 473 Introduction to Real Analysis 4 FO

Degree Commentary: The degree specific credits are much lower for double-majors and for students completing an additional minor (in another subject): 44 credits for students completing a second major, and 47 credits for students completing a minor.

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Bachelor of Arts Level: Major Subject: **Mathematics** Option: **Statistics**

Total Credits: 67 Cumulative GPA Required: 2.0

This degree option differs from the BA in Mathematics without an option only in the Option Requirements.

Lower Division Core

Category Name: Mathematics Core Courses Rule:

Criterion: C- Number of Credits 23

Course Listing Commentary:

Subcategory Name: Calculus I

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 171 Calculus I 4 F,S

M 181 Honors Calculus I 4 F

Subcategory Name: Calculus II

Rule: Take 1 of the following 2 courses.

Criterion: C- Number of Credits 4

Course Listing

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Rule: Take all of the following courses.

Criterion: C- Number of Credits 15

Course Listing

M 210 Intro to Mathematical Software 3 S

M 221 Introduction to Linear Algebra 4 F,S

M 273 Multivariable Calculus 4 F,S

M 300 Undergraduate Mathematics Sem 1 F,S

M 307 Intro to Abstract Mathematics 3 F,S

Major Electives

Category Name: Upper-Division Mathematics Requirement Rule: Take 23 credits in this category.

Criterion: C- Number of Credits 23

Course Listing

Commentary: (1) Students completing a minor (in another subject) need take only 20 credits.

(2) Students completing a second major need take only 18 credits.

Subcategory Name: Upper-Division Elective Courses

Rule: Take 7 courses from the following list; at least 3 of them must be at the 400 level. Criterion: C- Number of Credits 21 or more

Course Listing

M 301 Math Technology for Teachers 3 F

M 311 Ordinary Diff Equations/System 3 F

M 325 Discrete Mathematics 3

M 326 Number Theory 3 S

M 361 Discrete Optimization 3 S

M 362 Linear Optimization 3 F

M 381 Advanced Calculus I 3 F

M 412 Partial Differential Equations 3 S

M 414 Deterministic Models 3

M 429 History of Mathematics 3 S

M 431	Abstract Algebra I	4	F	
M 432	Abstract Algebra II	4	S	
M 439	Euclidean & Non-Euclidean Geo	3	F	
M 440	Numerical Analysis	4	I	
M 461	Practical Big Data Analytics	3		
M 462	Theoretical Big Data Analytics	3		
M 472	Intro to Complex Analysis	4	S	
M 473	Introduction to Real Analysis	4	FO	
M 485	Graph Theory	3	F	
STAT 341	Intro to Probability and Stat	3	F,S	
STAT 421	Probability Theory	3	F	
STAT 422	Mathematical Statistics	3	S	
STAT 452	Statistical Methods II	3	S	

Commentary: (1) Students completing a minor (in another subject) or a second major need take only 6 courses (totaling 18 credits or more).

(2) Residency Requirement: At least 4 of the courses in this category must be taken at UM-Missoula (only 3 if M 307 is taken at UM-Missoula).

(3) Note that STAT 451 does not count toward this requirement.

Subcategory Name: Upper-Division Elective Computer Labs

Rule: Computer labs from the following list are optional; if taken, they count toward the total number of credits required for the Upper-Division Mathematics Requirement.

Criterion: C- Number of Credits 0-5

Course Listing

M 317	ODE Computer Lab	1	F	
M 363	Linear Optimization Lab	1	F	
M 418	PDE Computer Lab	1	S	
STAT 457	Computer Data Analysis I	1	F	
STAT 458	Computer Data Analysis II	1	S	

Commentary: Cognates

Category Name: Science Requirement

Rule: Take 18 credits in at most 3 areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), economics (ECNS), forestry (FORS, WILD), geosciences (GEO), management information systems (BMIS), and physics (PHSX).

Criterion: C- Number of Credits 18

Course Listing

Commentary: (1) Students completing a minor (in another subject) or a second major are exempt from this requirement.

(2) Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Commentary:

Rule: Take 1 of the following 2 courses, or any other approved Advanced College Writing course. Criterion: C- Number of Credits 3

Course Listing

M 429 History of Mathematics 3 S

M 499 Senior Thesis 1 To 12

Additional Requirements

Category Name: GPA Requirement

Commentary: (1) A cumulative GPA of 2.0 is required for all courses used to fulfill major requirements.

(2) In addition, a cumulative GPA of 2.0 is required for all mathematical sciences courses used to fulfill major requirements. (Mathematical sciences courses are those with a prefix of M or STAT.)

Other Courses

Category Name: Foreign Language/Computer Science Requirement

Rule: Either complete the General Education Requirement "Group III: Modern and Classical Language" (not the symbolic systems exception), or take one course from the following list.

Criterion: C-

Course Listing	Number of Credits	3	
CSCI 100	Intro to Programming	3	F,S
CSCI 135	Fund of Computer Science I	3	F,S
CSCI 136	Fund of Computer Science II	3	F,S
CSCI 250	Computer Mdlng/Science Majors	3	F

Commentary: Students completing a second major are exempt from this requirement.

Commentary: Option Requirements

Category Name: Requirements for the Statistics Option Rule: Take the following courses.

Criterion: C- Number of Credits 9

Course Listing

STAT 341	Intro to Probability and Stat	3	F,S
STAT 421	Probability Theory	3	F
STAT 422	Mathematical Statistics	3	S

Commentary: Additional mathematics and statistics courses chosen with advisor. The degree specific credits are much lower for double-majors and for students completing an additional minor (in another subject): 41 credits for students completing a second major, and 46 credits for students completing a minor.

College Humanities & Sciences Catalog Year: 2015-2016

Degree Type: Minor Level: Minor Subject: **Mathematics**

Total Credits: 23 Cumulative GPA Required: 2.0

Lower Division Core

Category Name: Calculus Requirement for a Minor in Mathematics

Rule: Take one of the following three courses:

Course Listing

M 162 Applied Calculus 4 F,S

M 172 Calculus II 4 F,S

M 182 Honors Calculus II 4

Commentary: M 172 or 182 are recommended since they are prerequisites for many upperdivision mathematics courses.

Commentary:

Other Courses

Category Name: Elective Courses for a Minor in Mathematics

Rule: Take 23 credits in M or STAT courses offered at UMMissoula.

M courses must be numbered 115 or higher (excluding M 118). Courses must include at least three 3 or 4 credit courses at the 300 level or above.

Criterion: C

Number of Credits 23

Course Listing Commentary: (1) The required Calculus course (M 162, 172, or 182) counts toward the 23 credits, as well as its prerequisite courses at the 100 level (e.g., M 171 or 121). (2) Notice to Transfer Students: Mathematical Sciences courses that are not equivalent to courses taught at UMMissoula can often be counted toward a Minor in Mathematics. This is determined on an individual basis; please contact the Department of Mathematical Sciences for details.

Department Faculty

Professors

- Johnathan Bardsley, Professor
- Jonathan Graham, Professor
- Leonid Kalachev, Professor
- Mark Kayll, Professor
- Jenny McNulty, Associate Dean / Professor
- David Patterson, Professor
- Bharath Sriraman, Professor
- Brian Steele, Professor
- Emily Stone, Department Chair, Professor
- Karel Stroethoff, Professor
- Nikolaus Vonessen, Professor and Associate Chair - Undergraduate Program

Associate Professors

- Jennifer Brooks, Associate Professor
- Eric Chesebro, Associate Professor
- Kelly McKinnie, Associate Professor
- Gregory St. George, Associate Professor
- Ke Wu, Associate Professor

Assistant Professors

- Cory Palmer, Assistant Professor and Associate Chair - Graduate Program
- Frederick Peck, Assistant Professor
- Matthew Roscoe, Assistant Professor

Adjunct Faculty

- Richard Darnell, Adjunct Instructor