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B.S. IN MATHEMATICAL SCIENCES

2007-08

GENERAL EDUCATION REQUIREMENTS

INIV 112 Focused Inquiry II grade or better required, must complete decrease before enrolling. Initing Intensity: 2 Wil courses required, at least one must be in the acre. See Approved List A. IATH 490 Mathematical Expositions In this Statistics: IATH 141 or Placement) In the Statistics: IATH 141 or Placement of the following sequences of course form the sequence was in PHYS or CHEM OR must be in the physical sences of the BIOL, sequence was sedected. In the BIOL, sequence was sedected. In the BIOL, sequence was sedected to have a second major outside beginned for the sequence of the second of the sequence of the seque	<u> </u>	- ILLICAL LEGOCA	TOW REGULATED	
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MATHEMATICAL SCIENCES MAJOR

The Bachelor of Science degree awarded by the Department of Mathematics and Applied Mathematics requires a minimum of 42 credits above the 100 level in courses labeled MATH, OPER, or STAT. Students choose the concentration in mathematics, applied mathematic, biomathematics or secondary mathematics teacher preparation. At least 24 of these credits must be at the 300-500 levels.

Applied Mathematics

MATH 301 Differential Equations; MATH 512 Complex Analysis for Applications; MATH 517-518 Methods of Applied Mathematics; and six additional upper-level credits in mathematical sciences. (MATH 302 Numerical Calculus, MATH 437 Applied Partial Differential Equations, and MATH 511 Applied Linear Algebra are recommended.)

Mathematics

MATH 501 Intro to Abstract Algebra; MATH 507-508 Analysis I-II; MATH 509 General Topology; and six additional upper-level credits in mathematical sciences.

Secondary Teacher Preparation

MATH 327 Mathematical Modeling; MATH 504 Algebraic Structures and Functions; MATH 505 Modern Geometry; MATH 507 Analysis I; MATH 530 History of Mathematics; MATH 554 Using Technology in the Teaching of Mathematics

Biomathematics

MATH 301 Differential Equations; MATH 380 Introduction to Mathematical Biology; MATH 527-528 Methods of Applied Mathematics for Life Sciences; MATH 529 Computational Modeling in Mathematical Biology; and three additional upper level credits in mathematical sciences.

CONCENTRATION

Mathematics Core: Required for all Mathematical Science majors.	Credits	Grade
MATH 200 Calculus with Analytic Geometry I		
STAT 212 Concepts of Statistics		
MATH 201 Calculus with Analytic Geometry II		
MATH 255 Introduction to Computational Mathematics		
MATH 300 Introduction to Mathematical Reasoning		
MATH 307 Multivariate Calculus		
MATH 310 Linear Algebra		
MATH 490 Mathematical Expositions		

Concentration: Other required courses in mathe	matics	, , , , N.
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Electives: Select additional courses to satisfy the 120 credits needed to graduate.	Credits	Grade
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Additional degree requirements

- Cumulative 2.00 GPA
- 2.00 GPA in the major
- 45 credits in upper level courses or the equivalent
- □ 120 Total Earned Hours
- 30 At least 30 of the last 45 credits taken at VCU
- Computer literacy requirement (must either pass Computer Proficiency Assessment at www.equircte/knowledgenet.co or pass INFO 160,161, & 162 courses or equivalent transfer course)

College of Humanities & Sciences - Approved Lists

Approved List A - Written Communications

(See course descriptions in the bulletin for any prerequisites.)

UNIV 111 Facused Inquiry I UNIV 112 Focused Inquiry II ENGL 200 Writing and Rhetoric Workshop II (Taken in sophomore year.)

Writing intensive courses

African American Studies AFAM 408 Seminar in African-American Studies Anthropology ANTH 301/BIOL 341 Human Evolution

ANTH 302 Archeological Theory ANTH 303 Archeological Methods and Research Design ANTH-315 Anthropological freid Methods & Research Design ANTH-315 Anthropological Field Methods & Research Design ANTH-MIL 348 South American Ethnography ANTH-MIL 349 Rethinking a Confinent: Latin America ANTH-MINI 350 Rethinking a Confinent: Europe

ANTH/RELS/INTL 425 Religion, Magic and Witchcraft

logy BIOL 300 Biotechniques Laboratory (.5 Wi credit)

BIOL 390 Biotechniques Laboratory (5 W credit)
BIOL 3916 Laboratory in Genetics (5 W credit)
BIOZ 310L Laboratory in Genetics (5 W credit)
BIOZ 312L Invertebrate Zoology Laboratory (5 W credit)
BIOZ 311L Ecology Laboratory
BIOL 320 Biology of the Seed Plant (5 W credit)
BIOZ 321L Plant Development Laboratory BIOL 341/ANTH 301 Human Evolution

BIOL. 341/ANTH 301 Human Evolution
BIOL. 392 Introduction to Research
BIOL. 485 Neurobiology and Behavior (.5 WI credit)
BIOL. 514 Stream Ecology (.5 Wi credit)
BIOL. 518 Plant Ecology (.5 Wi credit)
BIOL. 522 Evolution and Speciation
BIOL. 522 Evolution and Speciation
BIOL. 524 Interest in Molecular Genetics (.5 WI credit)

CHEZ 303L Physical Chemistry Laboratory I CHEZ 409L instrumental Analysis Laboratory

minai justice CRJS/ENGL 302 Legal Writing CRJS/HSEP 330 Legal and Constitutional Issues in Homeland Security and Emergency Preparedness CRJS 358 Lawyer's Role in the Justice System

CRJS 480 Senior Seminar

onomics ECON 302 Macroeconomic Theory

ENGL 301 English Studies: Reading Literature ENGL/CRJS 302 Legal Writing ENGL 303 Writing in the Workplace

ENGL 304 Advanced Writing ENGL/MGMT 327 Business and Technical Report Writing ENGL/RELS 361 The Bible as Literature ENGL/ENVS 385 Nature Writing

ENGL 490 Senior Seminar in English (any topic)

witchmemal studies ENVS/ENGL 385 Nature Writing ENVS 490 Research Seminar in Environmental Studies

FREN 300, 301 Arivenced Grammar and Writing

Forensia science FRSC 365 Forensic Microscopy
FRSC 375 Forensic Evidence, Law and Criminal Procedures

GRMN 301 Advanced Grammar and Writing Geography GEOGI/INTL 303 World Regions

GEOG /URSP 306 Urban Economic Geography

History
HIST 300 Introduction to Historical Study HIST 369 American Constitutional and Legal Development

HiST 490 Seminar in History (any topic) meland Security and Emergency Preparedness HSEP/CRJS 330 Legal and Constitutional Issues in Homeland Security

and Emergency Preparedness HSEP 490 Senior Seminar

Humanities and sciences
HUMS 591 Special Topics: Arts in Contemporary Britain (summer course

Interdisciplinary science INSC 301 Investigatory Mathematics and Science

International studies
INTL/GEOG 303 World Regions
INTL/ANTH 348 South American Ethnography INTL/ANTH 349 Rethinking a Continent: Latin America INTL/ANTH 350 Rethinking a Continent: Europe

INTLIPOLI 365 International Political Foundation INTURELS/WWNS 372 Global Women's Spirituality INTLIRELS 409 Modern Islamic Thought and Global Trends INTLIRELS/PHIL 412 Zen Buddhism INTL/ANTRELS 425 Religion, Magic and Witchcraft INTL/RELS 441 Islamic Mysticism: the Sulis INTL/POLI 468 Serviner in Comparative Foreign Policy INTL/POLI 468 Serviner in Comparative Foreign Policy NTL 490 Seminer in International Issues

LFSC/PSYC 307 Community Solutions: Multiple Perspectives Mass communications MASC 203 Writing for Mass Media

MASC 333 Public Relations Writing MASC 363 Introduction to Broadcas MASC 392 Advertising Copywriting

MASC 403 Advanced Reporting MASC 404 Specialized Project Reporting MASC 475 Capital News Service

ithematics MATH 490 Mathematical Expositions

MATH 530 The History of Mathematics
MATH 531 Expositions in Modern Mathematics

nagement/Business MGMT/ENGL 327 Business and Technical Report Writing

perations Research
OPER/STAT 490 Communications in Statistics and Operations Research

Philosophy PHIL 301 Mind and Reality PHIL 302 Reason and Knowledge PHIL 303 Philosophy of Language

PHIL 320 Philosophy of Law PHIL 335 Social and Political Philosophy PHILANTURELS 412 Zen Budchism PHILA90 Seminar in Philosophy

PHYS 450 Senior Physics Laboratory Political science

POLI/WMNS 316 Women and the Law POLI 341, 342 History of Political Thought POLI/INTL 365 International Political Economy. POLI/INTL 468 Seminar in Comparative Foreign Policy POLI 490 Senior Semina

Psychology PSYC/LFSC 307 Community Solutions: Multiple Perspectives PSYC 317 Experimental Methods

Religious studies RELS/ENGL 361 The Bible as Literature

RELS/WMNS 371 Islam and Women RELS/WMNS/INTL 372 Global Women's Spirituality RELS/INTL 409 Modern Islamic Thought and Global Trends

RELSIPHILAND. 412 Zen Buddhism RELSIPHILAND. 412 Zen Buddhism RELSINDILANDH 425 Rehigion, Magic and Witchcraft RELSINDIL 441 Islamic Mysticism: the Sufis RELS 490 Seminar in Religious Studies

Saddagy SOCY 402 Sociological Theory SOCY 436 Work and Management in Modern Society anish SPAN 300, 301 Advanced Grammar and Writing

tistics and Operations Research STAT/OPER 490 Communications in Statistics and Operations

Urban studies URSP/GEOG 306 Urban Economic Geography

WWNS/POLI 316 Women and the Law WIVINS/RELS 371 Islam and Women WMNS/INTL/RELS 372 Global Women's Spirituality

Approved List B - Math & Statistics

(See course descriptions in the bulletin for any prerequisites.)

MATH 131 Introduction to Contemporary Mathematics MATH 151 Precalculus Mathematics MATH 200 Calculus with Analytic Geometry STAT 208 Statistical Thinking STAT 210 Basic Prac

STAT 212 Concents of Statistics (for science mains only)

Approved List C – Ethical Principles

(See course descriptions in the bulletin for any prerequisites.)

INTL 341/RELS 340 Global Ethics and the World's Religions MASC 290 Ethical Problems in Mass Media

PHIL 211 History of Ethics PHL 212 Ethics and Applications PHL 213 Ethics and Health Care

PHIL 214 Ethics and Business POLI 107 Political Theory RELS 340/INTL 341 Global Ethics and the World's Religions Sociology SOCY 445 Medical Sociology

Approved List D - Natural Sciences

(See course descriptions in the bulletin for any prerequisites.)

BIOL 101 Biological Concepts BIOZ 101L Biological Concepts Laboratory BIOL/ENVS 103 Environmental Science BIOZ/ENVZ 103L Environmental Science Laboratory BIOL 151 Introduction to Biological Science I (for biology and other BIOZ 151L Introduction to Biological Science Laboratory I (for biology

and other science majors) BIOL 152 Introduction to Biological Science II (for biology and other

BIOZ 1521. Introduction to Biological Science Laboratory II (for biology

and other science majors)

Physical sciences

CHEM 101 General Chemistry (for science majors) CHEZ/FRSZ 101L General Chemistry Laboratory (for science majors)
CHEM 110 Chemistry and Society
CHEZ 110L Chemistry and Society Laboratory
CHEM 112 Chemistry in the News

FRSZ/CHEZ 101L General Chemistry Laboratory (for science majors) PHYS 101 Foundations of Physics

PHYZ 101L Foundations of Physics Laboratory

PHYS 103 Elementary Astronomy
PHYZ 103L Elementary Astronomy Laboratory

PHYS 107 Wonders of Technology PHYS 202 General Physics (for science majors)

PHYS 208 University Physics II (for science majors)

Approved List E - Visual & Performing Arts

A. Basic-level courses designed specifically for non-arts majors.

Art education ARTE 301-302 Art for Elementary Teachers ARTE 408 Two-dimensional Art Experiences ARTE 409 Three-dimensional Art Experiences

ARTF 121-122 Introduction to Drawing Dance and choreography DANC 171, 172 Tai Chi

DANC 183, 184 Introduction to Modern Dance Technique DANC 313 Dance in World Cultures

Interior design IDES 103-104 Introductory Studio Course MHS 105 Introduction to Writing Music MHS 243 Music Appreciation

SCPT 209 Introduction to Sculpture

THEA 107, 108 Introduction to Stage Performance

B. Basic-level courses open to both art and non-art majors,

AFAMOANC 121, 122 Tap Technique I AFAMDANC 126, 127 African-Caribbean Dance AFAMM-BS 250 Introduction to African-American Music AFAM/THEA 303 Black Theatre
AFAM 350/MHIS 350/NTL 370 Studies in the Music of the African

Continent and Diaspora

history ARTH 103, 104 Survey of Western Art ARTH 207 Introduction to Non-Western Art ARTH 270, 271 History of the Motion Picture

CRAF 201-202 Metalsmithing CRAF 211-212 Jewelry

CRAF 221 Woodworking Techniques CRAF 241 Ceramics: Handbuilding CRAF 242 Ceramics: Wheelthrowing CRAF 251, 252 Introduction to Glassy CRAF 261, 262 Beginning Textiles

College of Humanities & Sciences - Approved Lists

Dance and choreography
DANC 103-104 Survey of Dance History
DANC 105-106 Improvisation DANC 134-104 Introvisation
DANC 114, 214, 314, 414 Summer Dence Workshop
DANC/IAFAM 121, 122 Tap Technique I
DANC/IAFAM 126, 127 African-Caribbean Dance I
DANC 133-134 Introduction to Ballet Technique I and II DANC 141, 142 Ballroom Dancing DANC 243 Dynamic Alignment DANC 291 Topics in Dance DANC 313 Dance in World Cultures eshion design and merchandising FASH 240 Survey of the Fashion Industry I Interior design IDES 103-104 Introductory Studio Course international studies

INTL 370/AFAM 350/MHS 350 Studies in the Music of the Africa Continent and Diaspora

APPM 300-level Private Instruction: Principal and Secondary Performing APPM 370 Large Ensembles (auditions required for all sections) APPM 390 Small Ensembles (auditions required for all sections) MHS 120 Introduction to World Musical Styles

MHS/AFAM 250 Introduction to African-American Music MHS 350/INTL 370/AFAM 350 Studies in the Music of the African Continent and Diaspora

THEA 103 Staneorafi THEA 211-212 Introduction to Drama THEA 229 Introduction to Lighting Design THEA/AFAM 303 Black Theals

C. Advanced-level courses open to both arts and non-arts majors. Some require special permission/audition.

Dance and choreography DANC 221, 222 Tap Technique II DANC 319, 320 Video/Choreography Workshop

Approved List F - Literature

ENGL 201 Western World Literature I ENGL 202 Western World Literature II FNGL 203 British Liferature I ENGL 204 British Literature II ENGL 205 American Literature ENGL 206 American Literature !! ENGL 211 Contemporary World Literature ENGL 215 Readings in Literature ENGL 216 Readings in Narrative ENGL/WMNS 236 Women in Literature ENGL 241 Shakespeare's Plays . ENGL 291 Topics in Literature

WMNS/ENGL 236 Women in Literature

African American studies

Approved List G - Historical & Cultural **Origins**

Anthropology
ANTH 1054NTL 104 Introduction to Archaeology
ANTH I056OG 312 History of Human Settlement Foreign language FRLG/INTL 203 Language and Identity Geography GEOG/ANTH 312 History of Human Settlement History
HIST 101 Survey of European History I HIST 102 Survey of European History II HIST/AFAM 105 Survey of African History I HIST/AFAM 106 Survey of African History II HIST 107 Survey of East Asian Civilizations I HIST 108 Survey of East Asian Civilizations It HIST 109 Survey of Latin American History I HIST 110 Survey of Latin American History !! INTL 104/ANTH 105 Introduction to Archaeotopy

AFAM/HIST 105 Survey of African History I AFAM/HIST 106 Survey of African History II

INTL/FRLG 203 Language and Identity INTL/RELS 311 Religions of the World I INTL/RELS 312 Religions of the World II ITAL 391/HUMS 491 Perugia Study Abroad

RELS/INTL 312 Religions of the World II

Philosophy
PHIL 103 Ancient Greek and Medieval Western Philosophy PHR 104 Modern Western Philosophy Religious studies RELS/INTL 311 Religions of the World I

Approved List H - American Studies

erican studies · AMST 394 Perspectives in American Studies reign language FRLGANTL 204 Language and Groups in the United States HIST 103 Survey of American History I HIST 104 Survey of American History II INTL/FRLG 204 Language and Groups in the United States POLL 103 U.S. Government Religious studies RELS 334 Religion in Contemporary America

Approved List I - Global Studies

ANTHINTL 455 Anthropology of Development and Globalization (INTL 101 prerequisite) Geography GEOG/INTL 303, 304 World Regions emational studies
INTL 101 Human Societies and Globalization INTL/POLI 105 International Relations INTL/MASC 151 Communications Technology and Global Society INTL/ GEOG 303, 304 World Regions MASCANTL 151 Communications Technology and Global Society POLINITI. 105 International Relations POLIJING 365 International Political Economy SOCY/INTL 330 Global Societies: Trends and Issues

Approved List J – Human Behavior

nropougy ANTH/INTL 103 Introduction to Anthropology ANTH/INTL 348 South American Ethnography (ANTH 103 prerequisite) ANTH/INTL 349 Rethinking a Continent: Latin America (ANTH 103 FCON 101/INTL 102 Introduction to Political Economy ECON 203 Introduction to Economic ography GEOG 102 Introduction to Human Geography Homeland Security and Emergency Preparedness
HSEP 101 Homeland Security and Emergency Preparedness emational dudies INTL 102/ECON 101 Introduction to Political Economy INTL/ANTH 103 Introduction to Anthropology INTL/ANTH 348 South American Ethnography (ANTH 103 prerequisite) INTL/ANTH 349 Rethinking a Continent: Latin America (ANTH 103 Mass communications MASC 101 Mass Communications Psychology PSYC 101 Introduction to Psychology Social Science SOCS 340 Human Sexuality Sociology SOCY 101 General Sociology SOCY 340 Self and Society Women's studies WIVINS 201 Introduction to Women's Studies

Approved List K – Urban Environment

All courses designated as "service learning" fulfill this requirement (See course descriptions in the bulletin for any prerequisites.)

ANTHIGEOG 312 History of Human Settlement
ANTHIGEOG MACHINITE 454 Cross-cultural Communication CRJS 181 Justice System Survey

CRJS 305 Policing Theories and Practice CRJS 352 Crime and Delinquency Prevention CRJS 468 Economic and Organized Crime

CRJS 491 Topics in Criminal Justice: Youth in Corrections/Service Learning (only this topic)

Economics ECON/URSP 321 Urban Economics

ENGL 454/INTL 454/ANTH 450 Conssentingal Communication

FNVS 491 Topics in Environmental Studies: Ecology of Urban Environments (only this topic)

FREN 301 Advanced Grammar and Writing

Foreign language FRLG 345/URSP 350/INTL 345 Great Cities of the World FRLG 490 Foreign Languages Urban Internship Geography GEOG/URSP 302 Land Use Capability

GEOG/URSP 306 Urban Economic Géography GEOG/ANTH 312 History of Human Settlement GEOGINTUURSP 340 World Cities Outside of North America

Humanities and science HUMS 391 Special Topics in the Humanities and Sciences: Science Education in the Urban Environment (only this topic)

International studies INTL/URSP/GEOG 340 World Cities Outside of North America INTL 345/FRLG 345/URSP 350 Great Cities of the World INTL 454/ANTH 450/ENGL 454 Cross-cultural Communication

Mass communications MASC 303 General Assignment Reporting MASC 403 Advanced Reporting MASC 404 Specialized Project Reporting MASC 439 Public Relations Campaigns MASC 464 Advance Television Newsgathering

Philosophy PHIL 340 Philosophy for Children

saus PHYS 291 Topics in Physical Science; Physics Outreach - Richmond Elementary Schools (only this topic) Political science

POLI 321 City Politics

Psychology PSYC 491 Topics in Psychology: Youth in Corrections/Service Learning (only this topic) PSYC 493 Fieldwork: Urban Environment (only this topic) PSYC 493 Fieldwork: Mentoring Children at Risk (only this topic)

SLWK 422 Social Welfare Legislation and Services Sociology SOCY 302 Contemporary Social Problems

SOCY 327 Urban Sociology SOCY 391 Topics in Sociology: Youth in Corrections/Service Learning (only this topic)

SPAN 402 Language Issues in the Spanish-speaking World

Teacher Education
TEDU 101 Introduction to Teaching

URSP 116 Introduction to the City

URSP 245 Housing and Community Revitalization URSP 261 Design of the City URSP/GEOG 302 Land Use Capability URSP 304 Urban Social Systems URSP/GEOG 306 Urban Economic Geography URSP/GEOT The Evolution of American Cities URSP 316 Urban Life in Modern America URSP/ECON 321 Urban Economics URSP/GEOG/INTL 340 World Cities Outside of North America URSP 350/INTL 345/FRLG 345 Great Cities of the World