

MATHEMATICS 580
Topics in the School Mathematics Curriculum

NOTE: This is a sample syllabus and subject to changes made for future semesters.

<p><u>Instructor:</u> Dr. DesLey Plaisance <u>Office:</u> 106-A Peltier <u>Phone:</u> 448.4433 <u>Email:</u> desley.plaisance@nicholls.edu <u>Office hours:</u> TBA</p>
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Catalog Description: MATH 580. **Topics in the School Mathematics Curriculum.** 3-3-0. Practices, activities, and delivery methods related to curriculum development, problem solving, and critical thinking. The four focus areas are algebra, geometry, precalculus, and calculus. Standards and guidelines from professional mathematical and educational organizations are examined as rubrics for curriculum development. (27.0101)

Prerequisite or Corequisite: MATH 509. **Logic and Foundations of Mathematics for Teachers.** Cornerstone course normally taken in first semester of graduate study. Developing and evaluating arguments and proofs, the use of various types of reasoning, methods of proof, making and investigating conjectures.

Required Text and Other Materials:

National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA

Mathematical Association of America (2003). *Guidelines for programs and departments in undergraduate mathematical sciences*. Washington, D.C.
<http://www.maa.org/guidelines/Dept-Guidelines-Feb2003.pdf>

American Psychological Association (2001). *Publication manual of the American psychological association; fifth edition*. Washington, D.C.

Note: Other materials may be brought in as needed.

Course Goal:

Given that many of the students in the MCCM program plan to work in a secondary or post-secondary setting, this course has been designed to assure that MCCM graduates can apply both general and discipline-specific curriculum theory to secondary and college mathematics curriculum development.

Students will become conversant with the thought processes that are the basis of secondary and college mathematics curricula. Curriculum issues and topics emanating from these thought processes will be detailed, along with forces that shape curriculum content, integration, delivery, and design. Mathematics curriculum research will be examined in an effort to identify critical issues such as sources of curriculum, elements of quality, and factors of importance for further research.

Course Objectives:

Upon completion of the course, the student will be able to:

- 1) Analyze the processes of mathematics curriculum development from epistemological, historical, psychological, and sociological perspectives.
- 2) Relate secondary and college mathematics curricula to external professional standards and accreditation processes as well as internal institutional development and approval processes.
- 3) Design, analyze, and assess mathematics programs and courses in conformance with the goals and objectives of the broader curriculum and institutional mission in addition to relevant external standards.
- 4) Articulate the major content themes in secondary and college mathematics courses.
- 5) Examine critically the role of textbooks and other materials in the mathematics curriculum.
- 6) Demonstrate an understanding of current research issues in mathematics curriculum at the secondary and college levels.
- 7) Judge sources of curriculum knowledge and research as reliable or otherwise.

Course Content (Tentative Schedule of Topics)

(Note that an overall understanding of the mathematics curriculum is the focus of the course, but each course topic will focus specifically on the areas of algebra, geometry, precalculus and calculus. In addition, analysis of appropriate research articles will be a component of each week's topic.)

Weeks 1-2:

Understanding Mathematics Curriculum

- Defining curriculum
- Historical antecedents
- Intellectual traditions
- Psychological and sociological perspectives

Weeks 3-4:

External Standards & Processes for Mathematics Curriculum

- Discipline-specific educational organizations
- Development of national, state, and local standards
- Nature of accreditation and accreditation organizations
- Roles of the state departments of education
- Roles of the federal government and its agencies
- Syllabi standards

Weeks 5-7:

Mathematics Curriculum Design Models

- Defining curriculum design
- Curriculum design issues
http://mathcurriculumcenter.org/research_framework.php
- Schools of thought on curriculum
- Secondary and college design models

Week 8:

Mathematics Curriculum Evaluation

- Evaluation of design effectiveness within specific courses (algebra, geometry, precalculus, and calculus)
- Evaluation of appropriate course sequencing including prerequisites

- Week 9: Internal Institutional Processes
- Curriculum approval within institutional governing structures
 - Overview of curriculum approval practices nationwide
- Weeks 10-12: Themes and Strands in the Mathematics Disciplines (Mathematics, Computer Science)
- Major themes and strands in secondary and college mathematics
 - Continuity of disciplinary themes and strands within the secondary curriculum
 - Distinctions in rigor between courses for majors, service courses, and general courses for nonmajors
- Week 13: Mathematics Curriculum Implementation
- Delivery modes and issues
 - Development of appropriate learning materials
 - Identifying appropriate textbooks

Course Requirements:

- 1) Assigned readings from books and journals
- 2) Substantive class discussion participation based on readings
- 3) Minimum of four short papers
- 4) Final Examination
- 5) Term Project: The development of a comprehensive teaching syllabus for a college-level mathematics course, the selection of an appropriate textbook, and other relevant learning materials.

Methods of Evaluation:

Class discussion:	50 points
Four short papers:	400 points
Term project:	100 points
<u>Final Examination:</u>	<u>150 points</u>
Total	700 points

Grading Scale:

90-100% A (630-700 pts)	80-89.9% B (560-629 pts)	70-79.9% C (490-559 pts)	60-69.9% D (420-489 pts)	Below 60 F (0 – 419 pts)
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Make-up Procedure: In that all assignments and examinations will be take-home assignments, students will have ample time to complete assignments. If a student has an emergency situation resulting in a late assignment, each situation will be handled based upon the circumstances.

Academic Honesty Policy: Disciplinary action for academic dishonesty will be handled according to the *Code of Student Conduct*. You may find a copy at the following Internet website:
http://www.nicholls.edu/documents/student_life/code_of_conduct.pdf

Attendance Policy: Participation in activities is required where an electronic record which clearly indicates time and date activity was submitted. For financial aid purposes, student must complete at least one activity, which is equivalent to having attended a class at least once.

Americans With Disabilities Act:

If you have a documented disability that requires assistance, you will need to register with the Office of Disability Services for coordination of your academic accommodations. The Office of Disability Services is located in Peltier Hall, Room 100-A. The phone number is (985) 448-4430 (TDD 449-7002).

Academic Grievances:

The proper procedure for filing grade appeals or grievances related to academic matters is listed in Section 5 of the Code of Student Conduct and at the following link:

http://www.nicholls.edu/documents/student_life/code_of_conduct.pdf.

DROP DATE: The last day to drop a course with a “W” is: xxxxxxxx

Continued Learning following an Extreme Emergency:

In order to make continued learning possible following an extreme emergency, **students are responsible for:**

- reading regular emergency notifications on the NSU website;
- knowing how to use and access Blackboard (or university designated electronic delivery system);
- being familiar with emergency guidelines;
- evacuating textbooks and other course materials;
- knowing their Blackboard (or designated system) student login and password;
- contacting faculty regarding their intentions for completing the course.

Faculty are responsible for:

- their development in the use of the Blackboard (or designated) software;
- having a plan for continuing their courses using only Blackboard and email;
- continuing their course in whatever way suits the completion of the course best, and being creative in the continuation of these courses;
- making adjustments or compensations to a student’s progress in special programs with labs, clinical sequences or the like only in the immediate semester following the emergency.

Turnitin Policy:

By taking this course, students agree that all assignments are subject to submission to Turnitin.com, an online plagiarism prevention and detection service. All work submitted to Turnitin.com will be added to its database of papers. Turnitin’s privacy policy and a description of the service available at <http://www.turnitin.com>. Specifically, this service compares your paper with Internet webpages, articles in databases, and all papers previously submitted from this university or any other. Turnitin then either confirms the originality of your work or gives the source of plagiarism. In cases of detected plagiarism, the paper and supporting evidence will be handled in compliance with the Student Code of Conduct (http://www.nicholls.edu/life/policy/code_of_conduct.pdf).

Bibliography

Articles (Partial List):

- Borst, R.W., Rorvig, V. (2006). On my mind: a national mathematics curriculum for the United States: two perspectives. *Mathematics Teaching in the Middle School*. 12(2): 70-72
- Flinders, D.J., Noddings, N., & Thornton, S.J. (1986). The null curriculum: its theoretical basis and practical implications. *Curriculum Inquiry*. 16(1): 33-42.
- Henkelman, J. (1965). Effecting mathematics curriculum change in the secondary school. *The American Mathematical Monthly*. 72(8): 895-897.
- Herrera, T.A., Owens, D.T. (2001). The “new new math”?: two reform movements in mathematics education. *Theory into Practice*. 40(2): 84-92.
- Kilpatrick, J. (2001). Where’s the evidence? *Journal for Research in Mathematics Education*. 32(4): 421-427.
- Kulm, G. (1999). Making sure that your mathematics curriculum meets standards. *Mathematics Teaching in the Middle School*. 4(8): 536-541.
- Marcus, R., Fukawa-Connelly, T., Conklin, M., & Fey, J.T. (2007). New thinking about college mathematics: implications for high school teaching. *Mathematics Teacher*. 101(5): 354-358.
- May, K.O. (1974). Mathematical education: history in the mathematics curriculum. *The American Mathematical Monthly*. 81(8): 899-901.
- Reys, B.J., Bay-Williams, J.M. (2003). Spotlight on the principles: the role of textbooks in implementing the curriculum principle and the learning principle. *Mathematics Teaching in the Middle School*. 9(2): 120-125.
- Popkewitz, T.S. (1988). Institutional issues in the study of school mathematics: curriculum research. *Educational Studies in Mathematics*. 19(2). *Mathematics Education and Culture*. (May, 1988), 221-249.
- Roberts, D.L. (2001). E.H. Moore’s early twentieth-century program for reform in mathematics education. *The American Mathematical Monthly*. 108(8): 689-696.
- Schoen, H.L., Hirsch, C.R. (2003). Responding to calls for change in high school mathematics: implications for collegiate mathematics. *The American Mathematical Monthly*. 110(2): 689-696.
- Smolarski, D.C. (2002). Teaching mathematics in the seventeenth and twenty-first centuries. *Mathematics Magazine*. 75(4): 256-262.
- Usiskin, Z., (1997). Reforming the third r: changing the school mathematics curriculum: an introduction. *American Journal of Education*. 106(1): 1-4.
- Usiskin, Z., (1997). Applications in the secondary school mathematics curriculum: a generation of change. *American Journal of Education*. 106(1): 62-84.

Books (Partial List):

- Brookfield, S.D., (1987). *Developing critical thinkers*. New Jersey: John Wiley & Sons, Inc.
- Cangelosi, J.S. (2003). *Teaching mathematics in secondary and middle school: an interactive approach*. New Jersey: Pearson Education, Inc.
- McNeil, J.D. (2005). *Contemporary curriculum: in thought and action*. New Jersey: John Wiley & Sons, Inc.
- Posamentier, A.S., Jaye, D., & Krulik, S. (2007). *Exemplary practices for secondary teachers*. Association for Supervision and Curriculum Development.
- Rubenstein, R.N., Bright, G.W. (Eds.). (2004). *Perspectives on the teaching of mathematics*. Virginia: National Council of Teachers of Mathematics.
- Stiff, L.V., Curcio, F.R. (Eds.). (1999). *Developing mathematical reasoning in grades k-12*. Virginia: National Council of Teachers of Mathematics.
- Usiskin, Z., Peressini, A., Marchisotto, E.A., & Stanley, D. (2003). *Mathematics for high school teachers: an advanced perspective*. New Jersey: Pearson Education, Inc.
- Zais, R.S. (1976). *Curriculum: principles and foundations*. New York: Thomas Y. Crowell Co.