

## **EDEC-614 Numeracy Across the Curriculum**

(3 credits)

Winter 2012

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### **Syllabus**

#### **1. Purposes of the Course**

"Numeracy" refers to the kind of numerical, computational, and graphical literacy which forms part of virtually all areas of the school curriculum. This course examines the nature and importance of numeracy as a particular way of knowing for learners, as well as the teaching approaches to utilizing and fostering this kind of learning in the classroom.

The history of the development of mathematics reveals that mathematics was mainly studied and practiced by the elite (Anderson, 1999). In those days, mathematics was not accessible for everyone. Now, in the 21<sup>st</sup> century, every country is trying to educate all its citizens in mathematics. But what does it mean to be mathematically educated? The main goal of this course is to begin to answer the question of what it means to be mathematically educated, and to investigate the impact of various answers to this question on different cultural groups and societies. We will discuss research that looks at the epistemology of mathematics, and cultural, social and political issues in the teaching and learning of mathematics for citizens in the world. We will also discuss how academic mathematics relates to everyday and professional life.

#### **2. Learning Outcomes**

The learning outcomes for the course are:

- Develop a personal sense of one's own numeracy;
- Reflect on the cultural, social and political nature of mathematics in society;
- Develop a critical stance toward the use of mathematics in school and in daily life;
- Develop an informed stance on what mathematics education should aim for;
- Connect issues of numeracy to one's own research project.

#### **3. Course Organization**

##### **Required Reading**

Eric Gutstein and Bob Peterson (2006.). *Rethinking Mathematics: Teaching Social Justice by the Numbers*. Milwaukee, WI: A Rethinking Schools Publication, 180 p.

You will find journal articles on WebCT.

### **Recommended Reading**

*Principles and Standards for School Mathematics.* (2000). Commission on Standards for School Mathematics. Reston, VA: National Council for Teachers of Mathematics.

**Weekly Schedule for the Course: Tuesday, 17:35- 20:25**

**Room 431**

**Office hours:** if you wish to make an appointment, electronic mail is the best way to contact me.

## **4. Evaluation**

The evaluation of the course will be based on four assignments, based on the one's following:

**Assignment A) Reflexive Report (15 pts):** This activity will require students to identify their own numeracy view and practices and to reflect about it.

Date due: April 10, 2012.

**Assignment B) Survey Project: (30 pts)** You will develop a survey or a focus group about numeracy. It could be done in team of two. This assignment will be presented in class.

Date due: March 27, 2012.

**Assignment C) Numeracy and Society (20 pts):** You will use Statistics Canada website and investigate a phenomenon related to numeracy. It could be done in team of two. This assignment will be presented in class.

Date due: March 13, 2012.

**Assignment D) Concept map (35 pts):** You will create your definition of Numeracy. It could be done in team of two. This assignment will be presented in class.

Date due: April 10, 2012.

## **5. Rights and Responsibilities**

You are reminded that your conduct and the conduct of the instructor are governed by the Handbook: Student Rights and Responsibilities. The full text of the Handbook is available at:

<http://www.mcgill.ca/deanofstudents/rights/>

**Academic Integrity:** McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism, and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see <http://www.mcgill.ca/integrity> for more information).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site <http://www.mcgill.ca/integrity> ).

**Privacy:** Student numbers serve a purpose at the institutional level. However, except in the case of final examinations, **do not** write your student number on lab assignments or on any other communications for this course. I would like to learn to know you by your name, not your number. You must protect your privacy and the privacy of your University records on Minerva or on WebCT.

To protect the privacy of student records, McGill personnel have been directed to reply to students only at the McGill uniform email address (UEA), usually [firstname.lastname@mail.mcgill.ca](mailto:firstname.lastname@mail.mcgill.ca). If email is

received from a non-McGill email address, the reply will be sent to the McGill email address. University policy requires that students check their McGill email account regularly for important messages.

### Tentative Schedule of Course Activities

	Week	Date	Readings before the class
	1	Jan 10	Syllabus
Numeracy	2	Jan 17	<p>Baker, D. A. (1996). Children's Formal and Informal School Numeracy Practices. In D.A. Baker, J. Clay, C. Fox (Eds.), <i>Challenging Ways of Knowing in English, Mathematics, and Science</i>. pp. 80-88. London : Falmer Press.</p> <p>Anderson, J. (1999). Being Mathematically Educated in the 21st Century: What Should it Mean? In C. Hoyles, C. Morgan, &amp;G. Woodhouse (Eds.), <i>Rethinking The Mathematics Curriculum</i> (pp.8-21). London: Falmer Press.</p>
	3	Jan 24	<p>Gellert, U., Jablonka, E., &amp; Keitel, C. (2001). Mathematical Literacy and Common Sense in Mathematics Education. In B. Atweh, H. Forgasz &amp; B. Nebres (Eds.), <i>Sociocultural Research on Mathematics Education: An International Perspective</i> (pp. 57-73). Mahwah, NJ: Lawrence Erlbaum Associates.</p> <p>Höfer, T. &amp; Beckmann, A. (2009). Supporting Mathematical Literacy: Examples from a cross-curricular project. <i>ZDM Mathematics Education</i>, 41: 223-230.</p>
Citizenship	4	Jan 31	<p>D'Ambrosio, U. (2009). Some Reflections on Education, Mathematics, and Mathematics Education. In R. Even, &amp; D.L. Ball (Eds.). (2009). <i>The Professional Education and Development of Teachers of Mathematics: The 15th ICMI Study</i>. (pp.239-244). New York: Springer.</p> <p>Rolka, K., Rösken, B. &amp; Liljedahl, P. (2006). Challenging the Mathematical Beliefs of preservice Elementary School Teachers. In J. Novotna, H. Moraova, M. Kratka &amp; N. Stehlikova (Eds), <i>Proceedings of the 30<sup>th</sup> Conference of The International Group for the Psychology of mathematics Education</i>, Prague. Vol 4, pp 441-448.</p> <p>Skovsmose, O. (1998). Linking Mathematics Education and Democracy: Citizenship. <i>Mathematical Archeology, Mathemacy and Deliberative Interaction</i>. <i>ZDM</i>, Vol. 30 (6), 195-203.</p>
Social Justice	5	Feb 7	Gugstein, E., & Peterson, B. <i>Rethinking Mathematics: Teaching Social Justice by the Numbers</i> . Milwaukee: Rethinking Schools Publication. (until p. 116).
	6	Feb 14	<p>Barta, J. Jetté, C., &amp; Wiseman, D. (2003). Dancing Numbers: Cultural, Cognitive, and Technical Instructional Perspectives on the Development of Native American Mathematical and Scientific Pedagogy. <i>Educational Technology Research and Development</i>. Vol. 51 (2). 87-97.</p> <p>Mukhopadhyay, S. (1998). When Barbie Goes to Classrooms: Mathematics in Creating a Social Discourse. In C. Keitel (Ed.), <i>Social Justice and Mathematics Education</i>. Berlin: Freire Universitat Berlin.</p>

	7	Feb 21	<b>McGill Study break</b>
Ethnomathematics	8	Feb 28	<p>Barton, B. (1996). Making Sense of Ethnomathematics: Ethnomathematics is Making Sense. <i>Educational Studies in Mathematics</i>, 31, 201-233.</p> <p>Gerdes, P. (1996). Ethnomathematics and Mathematics Education. In A. J. Bishop, K. Clements, C. Keitel, J. Kilpatrick &amp; C. Laborde (Eds.), <i>International Handbook of Mathematics Education</i> (Vol. 2, pp. 909-934). Dordrecht: Kluwer Academic Publishers.</p> <p>Mukhopadhyay, S., &amp; Greer, B. (2001). Modeling with Purpose: Mathematics as a Critical Tool. In B. Atweh, H. Forgasz &amp; B. Nebres (Eds.), <i>Sociocultural Research on Mathematics Education: An International Perspective</i> (pp. 295-311). Mahwah, New Jersey: Lawrence Erlbaum Associates.</p>
	9	Mar 6	<p>Abreu, G., Bishop, A., &amp; Presmeg, N. (2002). Mathematics Learners in Transition. In G. Abreu, A. Bishop, &amp; N. Presmeg (Eds.), <i>Transitions Between Contexts of Mathematical Practices</i>. (pp. 7-21). Dordrecht, The Netherlands: Kluwer.</p> <p>Wedge, T. (2010). Ethnomathematics and Mathematical Literacy: People Knowing Mathematics in Society. In C. Bergsten; E. Jablonka &amp; Tine Wedge (Eds.), <i>Mathematics and Mathematics Education: Cultural and Social Dimensions. Proceedings of MADIF 7. The Seventh Mathematics Education Research Seminar, Stockholm, 26-27 January, 2010</i> (pp. 31- 46). Linköping: Skrifter från SMDF, Nr.7, Linköping Universitet.</p>
Mathematics and Culture	10	Mar 13	<p>Abreu, G., Bishop, A., &amp; Presmeg, N. (2002). Researching Mathematics Learning: The Need for a New Approach. In G. Abreu, A. Bishop, &amp; N. Presmeg (Eds.), <i>Transitions Between Contexts of Mathematical Practices</i>. (pp. 1-5). Dordrecht, The Netherlands: Kluwer.</p> <p>Ernest, P. 'Empowerment in Mathematics Education', in Wong, K. Y., Tairab, H. T. and Clements, M. A., Eds. (2001) <i>Energising Science, Mathematics and Technical Education For All</i>, Brunei: Universiti Brunei Darussalam, 123-137. (ISBN: 99917-1-063-9)</p>
	11	Mar 20	<p>Bishop, A., J., &amp; Forgasz, H. J. (2007). Issues in Access and Equity in Mathematics Education. In F. Lester (Ed.), <i>Second Handbook of Research on Mathematics Teaching and Learning</i> (Vol. 2, pp. 1145-1167). Reston, VA: NCTM.</p> <p>Savard, A. (2011). Elementary Teachers Do Not Teach Through Mathematics. In J. Novotna &amp; H. Moraova, Ed. <i>International Symposium Elementary Mathematics Teaching</i>. Prague, Czech Republic, August 21-26. pp.297-305.</p>
Teaching Mathematics	12	Mar 27	Dörfler, W. (2003). Mathematics and Mathematics Education: Content and People, Relations and Difference. <i>Educational Studies in Mathematics</i> , 54, 147-170.
	13	Apr 3	Jablonka, E. (2003). Mathematical Literacy. In A. Bishop, M. Clements, C. Keitel, J. Kilpatrick, & F. Leung, (Eds.). <i>Second International Handbook of Mathematics Education</i> Berlin : Springer p. 77-104.
	14	Apr 10	