Course Title: "Gender and STEM Praxis"

Course Design: A Mani

Goal: The goal of the course is to explore the application of feminist principles to understand structural biases in the practice of STEM (Science, Technology, Education and Mathematics) with some focus on specialized topics. Participants will be encouraged to explore specialized subtopics.

PS: ***The literature suggested below is incomplete. Many more were used in the course.***

Contents and Brief Description:

A. **Sex and Gender Advanced Basics.**

In this module, concepts of sex and gender are reviewed. Some stress is placed on the historical bias against women in particular in the deficient development of the biology of sex. The distinction between dated ideas of "biological sex" used in older scientific and feminist literature, and relatively modern views are discussed. The multidimensional gender spectrum is explained in brief. Further asssuming some familiarity with gender theory, the nature vs nurture debate is explored.

Suggested Reading:

1. Serano, J.: *Excluded: Making Feminist and Queer Movements More Inclusive.* Seal Press, 2013.

2. Serano, J.: *Whipping Girl: A Transsexual Woman on Sexism and the Scapegoating of Femininity* (Second Edition) Seal Press, 2016.

3. Fine structure of Clitoris: https://odilefillod.wixsite.com/clitoris/outils?lang=en

Related Paper: https://dx.doi.org/10.1097/01.ju.0000158446.21396.c0, 2015.

4 Dutta, A. : An Epistemology of Collusion: Hijras, Kothis, and the Historical (Dis) continuity of Gender/Sexual Identities in Eastern India. Gender and History, 24(3):825-849, 2012.

5. Diamond, M.: *Biased-Interaction Theory of Psychosexual Development: "How Does One Know if One is Male or Female?*'. Sex Roles, 55:589–600, 2006

http://www.hawaii.edu/PCSS/biblio/articles/2005to2009/2006-biased-interaction.html

6. Winter, S. Et. Al: *Transgender people: health at the margins of society*

The Lancet, Volume 388, No. 10042, p390–400, 2016.

http://www.hawaii.edu/PCSS/biblio/articles/2015to2019/2016-transgender-people.html

http://www.hawaii.edu/PCSS/biblio/articles/2015to2019/2016-transgender-people-appendix.html

B. **Comparative Feminist Perspectives**

In this module key concepts and aspects of different feminisms are explored. Specifically the concepts of equity, equality, objectification, patriarchy, power and Nordic model are studied. Modern feminism can be traced to the activism and work of socialists before Karl Marx's times. The impact of these on the policies and praxis of socialist states is studied. Further the relation between religion and feminism and their incompatibility is explored.

Suggested Reading:

1. Nivedita Menon Seeing like a Feminist Penguin/Zubaan 2012

2. Sylvia Walby: Theorizing Patriarchy Basil Blackwell 1990

3. Judith Orr: Marxism and feminism today. International Socialsm Issue: 127, June 2010

4. Alexandra, Kollontai On Women's Liberation. Bookmarks, 1998.

Alexandra, Kollontai The Autobiography of a Sexually Emancipated Communist Woman, Translated by Salvator Attansio, Herder and Herder, 1971;

5. Chaya Datar: Non-Brahmin Renderings of Feminism in Maharashtra

Is It a More Emancipatory Force? EPW. October, 1999

6.Hester Eisenstein A Dangerous Liaison? Feminism and Corporate Globalization. Science and Society, Vol. 69, No. 3, July 2005, 487-518

7. History of Tibet and Religious Politics: 14 part series.

http://www.globaltimes.cn/content/916908.shtml

8. Donna Haraway: The Haraway Reader. Routledge, 2004

9. Sally Haslanger: Objectivity, Epistemic Objectification, and Oppression. In the Routledge Handbook to Epistemic Injustice. Ed. Ian Kidd, José Medina, and Gaile Pohlhaus. New York: Routledge, pp. 279-290, 2017.

Nordic Model: https://nordicmodelnow.org/what-is-the-nordic-model/ and related papers.

C. **Mathematics, Science and Women**

The distinction between content knowledge and mathematics knowledge for teaching is relevant for considerations relating to gender. This is explained and an overview of the state of participation of women in STEM disciplines is studied. Math anxiety has a major role to play in the advancement of women in all areas involving math skills. Aetiology of this phenomenon is explored in detail and proposed solutions are considered.

Suggested Reading:

1. Roy, Marie-Françoise, Guillopé, Colette, Cesa, Mark, Ivie, Rachel, White, Susan, Mihaljevic, Helena, ... Chiu, Mei-Hung. (2020, June 6). *A Global Approach to the Gender Gap in Mathematical, Computing, and Natural Sciences: How to Measure It, How to Reduce It?*. Zenodo. http://doi.org/10.5281/zenodo.3882609

2. Ashcraft M, Krause J.: *Working memory, math performance, and math anxiety*. Psych. Bull Rev. 2007, 14(2):243-248.

3. Hopko D, Mahadevan R, Bare R, Hunt M. *The Abbreviated Math Anxiety Scale (AMAS): construction, validity, and reliability*. Assessment. 2003;10(2):178-182.

4. Luttenberger, S. Wimmer, S. and Paechter, M: *Spotlight on Math Anxiety*, Psychology Research and Behavior Management 2018:11 311-322

5. Beilock S, Gunderson E, Ramirez G, Levine S. Female teachers math anxiety affects girls math achievement. Proc Natl Acad Sci U S A. 2010;107(5):1860-1863.

Aetiology of Math Anxiety in Girls

6. Mier, H. et Al: *Gender Differences Regarding the Impact of Math Anxiety on Arithmetic Performance in Second and Fourth Graders*. Front. Psychol., 18 January 2019 https://doi.org/10.3389/fpsyg.2018.02690

D. **History: Gender, STEM and Religion**

Topics covered in this module include:

Typical profile of the rare woman scientist of the 19th century and before.

Science policy, Soviet science and policy – their impact.

Nature of progress of women in science in the 20th century.

Narratives of trans and queer women of science. Related typical profiles.

Suggested Reading:

1. Hilary Rose, Beyond Masculinist Realities: A Feminist Epistemology in Feminist Approaches to Science, ed. Ruth Bleier, Athene Series (New Pergamon Press, 1986), 57-76.
2. Rose, Hilary: Comment on Schiebingers The History and Philosophy of Women in Science: A Review Essay, Signs, 1988, 13, 2, 377–380 http://www.jstor.com/stable/3174099
3. Gendered Innovations in Science and Engineering Edited by Londa Schiebinger, Stanford. 2008.
4. Number of Biographies/Narratives
5. Lynn Conway: Autobiography

E. **Related Topics and Methodological Issues**

Topics covered are importance of diversity, the way it affects STEM research and aspects of best practices.

F. **Women in Computer Science and Technology**

Global history of participation of women in computer science, engineering and allied fields. Related Studies. The free software movement, participation of women in FOSS, problems faced, and steps undertaken over the years.

Suggested Reading:

1. Web: Geek Feminism Wikia, Ubuntu Women Project, Linuxchix, Other Women in FOSS Projects.

2. John Impagliazzo, Eduard Proydakov (Eds.) Perspectives on Soviet and Russian Computing First IFIP WG 9.7 Conference, SoRuCom Springer, 2006.

3. Richard Stallman: Free Software, Free Society Selected Essays. FSF 2015

4. Sara Schooneker: Free Software, the Internet, and Global Communities of Resistance. Routledge 2015

5. Example country specific variants: A Chinese FOSS: http://www.kylinos.cn/

6. Mani, A and Rebeka Mukherjee: A Study of FOSS 2013 Survey Data Using Clustering Techniques IEEE WIECON-ECE, 118-121, DOI: 10.1109/WIECON-ECE.2016.8009099,2016

Start Date: 20th May 2020

End Date: 10tht July 2020

Class Timings: Wednesday 15:00 -17:00 hours