



Open Educational Resources

---

4-10-2024

## Mindfulness through Biofeedback and Meditation Syllabus

Eric B. Miller

University of North Dakota, [eric.b.miller@und.edu](mailto:eric.b.miller@und.edu)

[How does access to this work benefit you? Let us know!](#)

Follow this and additional works at: <https://commons.und.edu/oers>



Part of the [Music Therapy Commons](#), [Nursing Commons](#), and the [Psychology Commons](#)

---

### Recommended Citation

Miller, Eric B., "Mindfulness through Biofeedback and Meditation Syllabus" (2024). *Open Educational Resources*. 34.

<https://commons.und.edu/oers/34>

This Syllabus is brought to you for free and open access by UND Scholarly Commons. It has been accepted for inclusion in Open Educational Resources by an authorized administrator of UND Scholarly Commons. For more information, please contact [und.common@library.und.edu](mailto:und.common@library.und.edu).



## **Mindfulness through Biofeedback and Meditation Syllabus**

Eric B. Miller, Ph.D.

### **Course Title: Mindfulness through Biofeedback and Meditation**

**Course Description:** This course explores the integration of mindfulness techniques with biofeedback and meditation practices for enhancing self-awareness, stress reduction, and overall well-being. Drawing on bio-guided practices, students will delve into the principles and applications of biofeedback, meditation, and how they intersect to cultivate mindfulness.

**Materials:** Students will need access to a computer with internet access. Students will periodically need access to a PC running Windows. Students will need at minimum at least one physiological monitoring device, such as a smart watch heart rate monitor or spO2 indicator, a thermometer, pulse-ox, EEG headset such as MindWave or Muse, or other physiological monitor. At best, an actual multi-channel biofeedback device would be preferable. If you have questions about your monitor, please message the instructor.

### **Course Objectives:**

Students will:

- Understand the theoretical principles of biofeedback and mindfulness.
  - Explore various meditation techniques and their effects on physiological responses.
  - Understand the physiological measures used in biofeedback and their relevance to mindfulness and meditation.
  - Provide teachers with practical techniques to manage stress.
- 

### **Assignments:**

1. Weekly Reflection Journals: Reflect on personal experiences with Mindfulness and biofeedback activities. Please post your take-aways from the class readings and experiential exercises in the online discussion forum. 25%

2. Write up of active meditation experience using a physiological monitor with reference to your personal physiological and or emotional response and presentation of your collected data. 25%
3. Create a personalized meditation: Use sounds or music as you please and develop either a guided meditation script or instruction for a meditation with personalized objectives. Share the outline in the assignment forum and upload a recording of it. 25%
4. Final Project: Develop a personal or educational mindfulness activity that addresses personally identified objectives. Describe the activity itself, materials needed, objectives and summary of personal experience. 25%

**Assessment:**

1. Active participation in discussions and activities.
2. Completion of assignments.
3. Final project.

**Credit Hours:**

4 hours of instructional video by presenter and related YouTube selections.

6 hours reading of books, book chapters and articles.

5 hours conducting experiential projects with write-ups.

---

**Course Duration:** 8 classes

**Class 1: Introduction to Mindfulness and Biofeedback**

- Overview of mindfulness practices and their benefits
- Introduction to biofeedback techniques and applications
- Exploring the mind-body connection

**Readings:**

- "Bio-guided Music Therapy" by Eric B. Miller
  - Introduction
  - Chapter 1: Historical Background
  - Chapter 2: Shifting Healthcare Paradigms

#### Supplementary Articles:

- "The Science of Mindfulness" by Sarah Moore
- <https://www.mindful.org/find-your-focus-own-your-attention-in-12-minutes-a-day/>
- Video: <https://www.youtube.com/watch?v=S-W1GFBJbt0>

#### Experiential Activity:

How to Meditate – a 2 Minute exercise <https://www.mindful.org/how-to-meditate/>

---

#### Class 2: Mindful Breathing and Heart Rate Variability

- Mindful breathing techniques for stress reduction
- Understanding heart rate variability (HRV) as a biofeedback measure
- Practice of heart-focused breathing for enhancing HRV coherence

#### Readings:

- "Bio-guided Music Therapy" by Eric B. Miller
  - Chapter 6: Biofeedback Measures with Music

#### Supplementary Articles:

- **Heart rate variability: How it might indicate well-being, *By Harvard Health Publishing Staff***
- <https://www.health.harvard.edu/blog/heart-rate-variability-new-way-track-well-2017112212789>
- Video: <https://www.youtube.com/watch?v=zUyuUoU7IAQ&t=10s>

#### Experiential Activity:

- Paced breathing targeting 6 breaths/ minute (with HRV monitoring if possible).

Free on-line breath pacers:

<https://www.grc.com/breathe.htm>

<https://mindfuldevmag.com/breathing-timer/>

---

### **Class 3: Mantra and Musical Meditation**

- Introduction to mantra meditation.
- Introduction to musical meditation.

#### **Readings:**

- What To Know About Mantras for Meditation, Medically Reviewed by Mahammad Juber, MD on August 10, 2022 Written by Roma Kunde  
<https://www.webmd.com/balance/what-to-know-mantras-meditation>
- Have Trouble Meditating? Try Mantra Meditation, Medically reviewed by Timothy J. Legg, PhD, PsyD — By Crystal Raypole on August 18, 2020.  
<https://www.healthline.com/health/mantra-meditation>

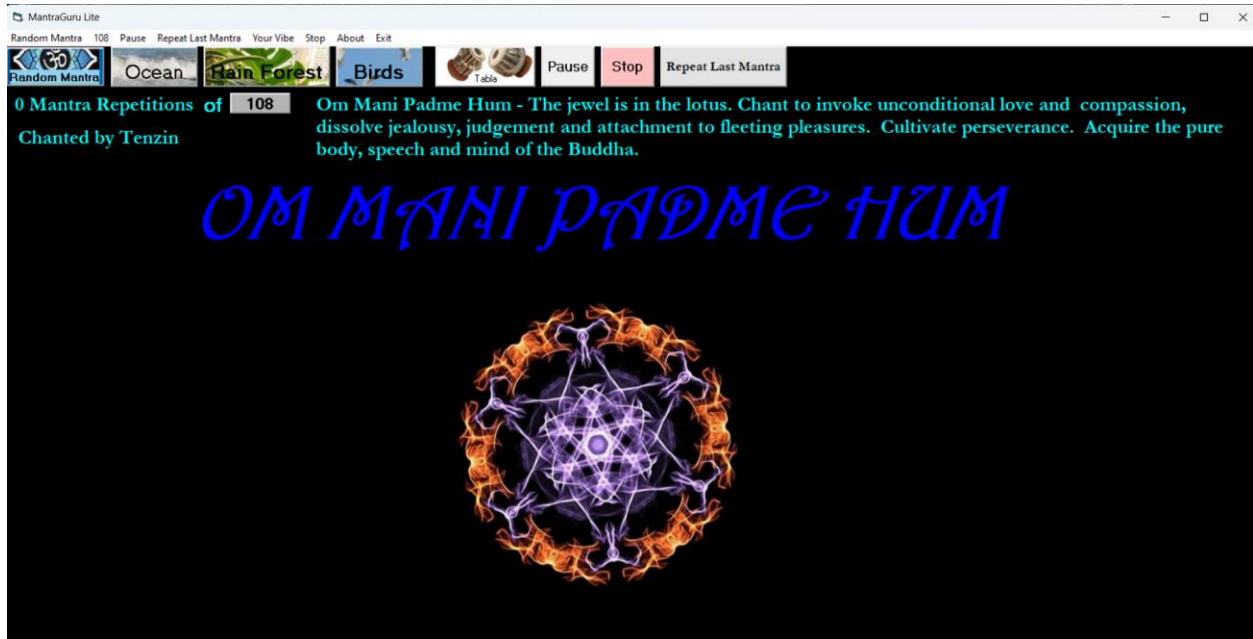
#### **Experiential Activity:**

- Practice with the free PC app “Random Mantra Lite” in BB Resources section
- Experiment with adding background nature sounds

#### **Video:**

##### **Intro to Mantra Meditation with Dr. Miller**

<https://youtu.be/OU5DsysEiWs>



---

#### **Week 4: Biofeedback, Stress and Autonomic Nervous System Regulation**

- Exploring the autonomic nervous system (ANS) and its role in stress response
- Understanding the role of GSR in emotional arousal and stress
- Practice of biofeedback-assisted relaxation techniques

#### **Readings:**

- "Bio-guided Music Therapy" by Eric B. Miller

Chapter 9: Bio-Guided Music Therapy for Stress

#### **Supplementary Articles:**

- "Understanding the Autonomic Nervous System" by Verywell Health
- "Biofeedback Therapy: A Non-invasive Way to Overcome Stress" by Psychology Today

**Video:**

Dr. Miller: Adding EDG and heart rate tones on MIndDrive with BioDisplay

<https://www.youtube.com/watch?v=MZGV9TOYo-A>

Dr. Miller: Native Flute Biofeedback

<https://commons.und.edu/oers/13/>

**Experiential Activity:**

- Biofeedback-assisted relaxation practice for ANS regulation. Use GSR or biofeedback of your choice to provide feedback periodically during your meditation practice to inform if your nervous system is activating or relaxing.

-----

**Class 5: Mindfulness, Biofeedback, and Chronic Pain Management**

- Understanding the role of mindfulness and biofeedback in chronic pain management
- Techniques for reducing pain perception and enhancing well-being
- Practice of mindfulness-based biofeedback interventions for chronic pain

**Readings:**

- "Bio-guided Music Therapy" by Eric B. Miller
  - Chapter 13: Bio-Guided Music Therapy for Pain, p. 188 – 193.
  - Chapter 11: Bio-Guided Music Therapy for the Aging, p. 164 – 168.

**Supplementary Articles:**

- "Mindfulness-Based Approaches for Chronic Pain Management" by Frontiers in Psychiatry
- "Biofeedback Techniques for Pain Management" by Mayo Clinic
- Mindfulness exercises for Pain Management - Compilation by Dr. Eric Miller from Google & Harvard Health Publishing – pdf

**Experiential Activity:** Mindfulness-based pain management exercises with biofeedback monitoring if available. Source: Mindfulness exercises for Pain Management - Compilation by Dr. Eric Miller from Google & Harvard Health Publishing – pdf

## **Week 6: Mindfulness and Meditation for Educators**

- Exploring the benefits of mindfulness and meditation for educators
- Understanding the impact of stress on teaching and learning
- Techniques for integrating mindfulness into the classroom environment

### **Readings:**

- "The Mindful Teacher: A Guide to Mindfulness and Self-Care for Educators" by Edutopia
- "Mindfulness in Education: Practicing Mindfulness with Children" by Greater Good Magazine
- 8 Activities for Students (and Teachers) to Create a Mindful Classroom. By Maurice J. Elias. October 27, 2021: <https://www.edutopia.org/article/8-activities-students-and-teachers-create-mindful-classroom/>

### **Experiential Activity:**

- Mindfulness meditation exercises tailored for educators from "5 Mindfulness Practices for Stressed-Out Teachers."
- Reflection and discussion on integrating mindfulness practices into teaching methodologies

This week's focus on mindfulness and meditation for educators aims to provide teachers with practical techniques to manage stress, cultivate self-awareness, and create a more supportive learning environment for both themselves and their students.

---

## **Class 7: Mindfulness Meditation with Binaural Beats and Electroencephalography (EEG) Neurofeedback**

- Introduction to binaural beats
- Understanding brainwave frequencies and EEG biofeedback
- Practice of meditation with binaural beats and EEG feedback if available.

### **Readings:**

- "Bio-guided Music Therapy" by Eric B. Miller
  - Chapter 10: Bio-Guided Music Therapy for ADHD

### **Supplementary Articles:**

- "How to Practice Mindfulness Meditation" by Mindful
- "Understanding EEG Brainwave Frequencies" by Brainworks Neurotherapy



### **Experiential Activity:**

- Guided mindfulness meditation session with EEG monitoring
- Binaural Beat Assignment:

Video: Dr. Miller reviews binaural beat theory in class:

Video: Dr. Miller narrates a screen capture sequence of creating a binaural beat audio track using an online frequency generator, and adding a musical bed track in Audacity. Output file is exported as an MP3.

<https://commons.und.edu/oers/18/>

---

### **Class 8: Integration and Application of Mindfulness**

- Reflection on the integration of mindfulness and biofeedback practices
- Application of learned techniques in daily life and personal wellness routines
- Creating a personalized mindfulness and biofeedback plan for ongoing practice

### **Readings:**

- "Bio-guided Music Therapy" by Eric B. Miller
  - Chapter 6: Biofeedback Measures with Music
  - Chapter 4: A Case for Integrating Music Therapy and Biofeedback

### **Supplementary Articles:**

- "Bringing Mindfulness into Daily Life" by Mindful.org
- "Practical Tips for Using Biofeedback at Home" by Healthline

### **Experiential Activity:**

- Creation of a personalized mindfulness and biofeedback plan or Final Project

## References and Resources:

Andrew E Budson. (2021). Can mindfulness change your brain? [online]. Harvard Health. Available from: <https://www.health.harvard.edu/blog/can-mindfulness-change-your-brain-202105132455> (Accessed March 2023)

Hofmann, S.G. and Gómez, A.F. (2017) "Mindfulness-based interventions for anxiety and depression," *Psychiatric Clinics of North America*, 40(4), pp. 739–749. Available at: <https://doi.org/10.1016/j.psc.2017.08.008>.  
Mentz et al. "Late-breaking science abstracts and featured Science abstracts from the American Heart Association's Scientific sessions 2022 and late-breaking abstracts in resuscitation science from the resuscitation science symposium 2022" (2022) *Circulation*, 146(25). Available at: <https://doi.org/10.1161/cir.0000000000001116>.

Eric B. Miller, Clinton F. Goss (2014). Trends in physiological metrics during Native American Flute Playing. *Nordic Journal of Music Therapy*, April.  
DOI:10.1080/08098131.2014.908944

Parmentier, F.B. et al. (2019) "Mindfulness and symptoms of depression and anxiety in the general population: The mediating roles of worry, rumination, reappraisal and suppression," *Frontiers in Psychology*, 10. Available at: <https://doi.org/10.3389/fpsyg.2019.00506>.

Schuman-Olivier Z, Trombka M, Lovas DA, Brewer JA, Vago DR, Gawande R, Dunne JP, Lazar SW, Loucks EB, Fulwiler C. Mindfulness and Behavior Change. *Harv Rev Psychiatry*. 2020 Nov/Dec;28(6):371-394. doi: 10.1097/HRP.0000000000000277. PMID: 33156156; PMCID: PMC7647439. Retrieved 03/2024:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7647439/>

Roma, Kunde (2022). What To Know About Mantras for Meditation, Medically Reviewed by Mahammad Juber, MD. <https://www.webmd.com/balance/what-to-know-mantras-meditation>

Raypole, C., (2020). Have Trouble Meditating? Try Mantra Meditation, Medically reviewed by Timothy J. Legg, PhD, PsyD — By Crystal Raypole on August 18, 2020.  
<https://www.healthline.com/health/mantra-meditation>

Vveinhardt, J. and Kaspore, M. (2022) “The relationship between mindfulness practices and the Psychological State and performance of Kyokushin Karate athletes,” *International Journal of Environmental Research and Public Health*, 19(7), p. 4001. Available at: <https://doi.org/10.3390/ijerph19074001>

---

Quote from the APA Dictionary of Psychology  
<https://www.apa.org/topics/mindfulness#>

New Mindfulness Method Helps Coaches, Athletes Score

<https://www.apa.org/news/press/releases/2017/08/mindfulness-method>

Mindfulness and Behavior Change.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7647439/>

<https://www.news-medical.net/health/The-Science-of-Mindfulness.aspx>

The-Science-of-Mindfulness.pdf Sarah Moore.

Dr. Miller: Adding EDG and heart rate tones on MIndDrive with BioDisplay

[https://youtu.be/MZGV9TOYo-A?si=\\_NFEH\\_jGJXYS0dF](https://youtu.be/MZGV9TOYo-A?si=_NFEH_jGJXYS0dF)

**Heart rate variability: How it might indicate well-being, *By Harvard Health Publishing Staff***

<https://www.health.harvard.edu/blog/heart-rate-variability-new-way-track-well-2017112212789>

Applying Neuroplasticity

<https://andreasamadi.podbean.com/page/3/>

Beginner Meditation Video by Jessica Richburg:

<https://www.youtube.com/watch?v=S-W1GFBJbt0>

A variety of meditation and mindfulness techniques may be found at:

<https://www.mindful.org/how-to-meditate/>

---

*Netiquette* is a set of rules for behaving properly online. Here are a few basic points to remember when communicating in this course:

- ***Be scholarly.*** Use proper language, grammar, and spelling. Explain your thoughts, justify opinions, and credit the ideas of others by citing or linking to scholarly resources. Avoid misinforming others when you are unsure of the answer. When discussing something and supplying a guess, clearly state that.
- ***Be respectful.*** Respect the privacy of others. Do not share personal or professional information about others unless permission has been granted. Respect diversity and opinions that differ from their own. Be tactful when you communicate.
- ***Be professional.*** Everyone should strive to give their best impression online. Truthfulness, accuracy, and running a final spell check are appropriate expectations for university students. Writing in a legible font and limiting the use of emoticons is considered professional behavior. Profanity and participation in hostile interactions, known as flaming, is unprofessional as well as disruptive.
- ***Be polite.*** Students should be addressing professors and instructors by the appropriate title or requested name. Students should interact online politely, just as they would be expected to do in a physical environment. Sarcasm rudeness, and writing in all capital letters (shouting) should be avoided.

For more information, read the [Top 12 Be-Attitudes of Netiquette for Academicians](#).

### About UND Professional Development for Educators Courses

You have up to four months to complete this course from the time of your enrollment. You may work at your own pace and complete lessons/exams on your own schedule, submitting up to 3 per week for grading.

After you finish your course, your final grade will be posted in Blackboard. Please **allow 3-5 business days for your final grade to appear** on your transcript in Campus Connection. You will receive a confirmation email from the Enroll Anytime staff once the final grade is officially posted on your transcript. You may then order an official transcript, if desired.

If you have an **administrative** question regarding course enrollment dates, extensions, withdrawals, questions regarding your transcript, or need exam assistance, please contact the **Office of Extended Learning** at [und.courses@UND.edu](mailto:und.courses@UND.edu) or 701-777-0488.

Questions regarding **coursework** should be directed to the **instructor**.

For **technical support** including username and password help, assignment submission, or other technical assistance in the course, contact [University Information Technology](#).

### Student Resources

Many services are available to online students such as writing assistance from the UND Writing Center. Visit the [Student Resources page](#) for more information. You can also access the resources webpage from the *Student Resources* link in your Blackboard course menu.

### A final note *(optional)*

Share any other information not previously covered in the syllabus that you want to make sure students are aware of.

## University of North Dakota Policies & Resources

### Academic Integrity

Academic integrity is a serious matter, and any deviations from appropriate behavior will be dealt with strongly. At the discretion of the professor, situations of concern may be dealt with as a scholastic matter or a disciplinary matter.

As a scholastic matter, the professor has the discretion to determine appropriate penalties to the student's workload or grade, but the situation may be resolved without involving many individuals. An alternative is to treat the situation as a disciplinary matter, which can result in suspension from the University, or have lesser penalties. Be aware that I view this as a very serious matter, and will have little tolerance of or sympathy for questionable practices. A student who attempts to obtain credit for work that is not their own (whether that be on a paper, quiz, homework assignment, exam, etc.) will likely receive a failing grade for that item of work, and at the professor's discretion, may also receive a failing grade in the course. Read more in the [Code of Student Life](#).

### Disability Support and Medical Services

If you have emergency medical information to share with me, or if you need accommodations in this course because of a disability, please contact me. If you plan to request disability accommodations, you are expected to register with the Disability Support Services (DSS) office (180 McCannel Hall, 701.777.3425) or [you may register online](#).

If you have a temporary medical condition such as a broken arm or recovering after surgery,

you may be able to arrange for courtesy services. In most cases, it is expected that you will make your own arrangements for these services. An example of a courtesy service includes access to a test scribe if the student has a broken hand. If you are unable to make your own arrangements, please contact [DSS](#) (701.777.3425). Unlike services and/or accommodations provided to eligible students with disabilities, the University is NOT obligated to provide courtesy services.

### Resolution of Problems

Should a problem occur, you should speak to your instructor first. If the problem continues to be unresolved, go to the department chair, and next to the college Dean. Should the problem persist, you have the right to go to the Provost next, and then to the President.

### Notice of Nondiscrimination

It is the policy of the University of North Dakota that no person shall be discriminated against because of race, religion, age, color, gender, disability, national origin, creed, sexual orientation, gender identity, genetic information, marital status, veteran's status, or political belief or affiliation and the equal opportunity and access to facilities shall be available to all. Concerns regarding Title IX, Title VI, Title VII, ADA, and Section 504 may be addressed to Donna Smith, Director of Equal Employment Opportunity/Affirmative Action and Title IX Coordinator, 401 Twamley Hall, 701.777.4171, [und.affirmativeactionoffice@UND.edu](mailto:und.affirmativeactionoffice@UND.edu) or the Office for Civil Rights, U.S. Dept. of Education, 500 West Madison, Suite 1475, Chicago, IL 60611 or any other federal agency.

### Reporting of Sexual Violence

If you or a friend has experienced sexual violence, such as sexual assault, domestic violence, dating violence or stalking, or sex-based harassment, please contact UND's Title IX Coordinator, Donna Smith, for assistance: 701.777.4171; [donna.smith@UND.edu](mailto:donna.smith@UND.edu); or visit the [UND Title IX site](#).

### Faculty Reporting Obligations Regarding Sexual Violence

It is important for students to understand that faculty are required to share with UND's Title IX Coordinator any incidents of sexual violence they become aware of, even if those incidents occurred in the past or are disclosed as part of a class assignment. This does not mean an investigation will occur if the student does not want that, but it does allow UND to provide resources to help the student continue to be successful at UND. If you have been the victim of sexual violence, [learn more about confidential support services](#) at UND.

### UND Cares Program

The [UND Cares program](#) seeks to educate faculty, staff and students on how to recognize warning signs that indicate a student is in distress.

### How to Seek Help When in Distress

We know that while college is a wonderful time for most students, some students may struggle. You may experience students in distress on campus, in your classroom, in your home, and

within residence halls. Distressed students may initially seek assistance from faculty, staff members, their parents, and other students. In addition to the support we can provide to each other, there are also professional support services available to students on campus through the Dean of Students and University Counseling Center. Both staffs are available to consult with you about getting help or providing a friend with the help that he or she may need. Visit the [UND Cares program](#) webpage for more additional information.

### How to Recognize When a Student is in Distress

The term “distressed” can mean any of the following:

- Student has significant changes in eating, sleeping, grooming, spending, or other daily activities.
- Student has cut off or minimized contact with family or friends.
- Student has significant changes in performance or involvement in academics, sports, extracurricular, or social activities.
- Student describes problems (missing class, not remembering, destructive behavior) that result from experiences with drinking or drugs.
- Student is acting withdrawn, volatile, tearful, etc.
- Student is acting out of character or differently than usual.
- Student is talking explicitly about hopelessness or suicide.

### Land Acknowledgement Statement

Today, the University of North Dakota rests on the ancestral lands of the Pembina and Red Lake Bands of Ojibwe and the Dakota Oyate - presently existing as composite parts of the Red Lake, Turtle Mountain, White Earth Bands, and the Dakota Tribes of Minnesota and North Dakota. We acknowledge the people who resided here for generations and recognize that the spirit of the Ojibwe and Oyate people permeate this land. As a university community, we will continue to build upon our relations with the First Nations of the State of North Dakota - the Mandan, Hidatsa, and Arikara Nation, Sisseton-Wahpeton Oyate Nation, Spirit Lake Nation, Standing Rock Sioux Tribe, and Turtle Mountain Band of Chippewa Indians.

### Additional Resources

It is my goal to foster an environment of mutual respect in which everyone feels comfortable voicing their opinions, sharing their stories, and learning about potentially heavy or personally relevant material. If, at any point, you feel like the information covered in this class elicits thoughts, feelings, or concerns that you would like to discuss further, don't hesitate to reach out to me, or the [UND Counseling Center](#) (701-777-2127)

Further, if you experience extenuating circumstances, sexual violence, identity-based harm, or any other personal crisis during the semester, don't hesitate to reach out to me so we can provide academic assistance and help you in this course, and put you in contact with the appropriate resources and services (if needed).

- [UND Care Team](#): 701-777-2664 (8:00 AM to 4:30 PM M-F) or 701-777-3491 (evenings and weekends)

- [UND Campus Police](#): 701-777-3491 ·UND Student Health: 701-777-4500
- [UND Title IX Resources](#)
- [Abuse and Rape Crisis Hotline \(CVIC\)](#): 701-746-8900 (24 hours)
- [Grand Forks Police Department](#): 701-787-8000 (24 hours)
- [Emergency Room](#): 701-780-5280
- [UND Student Diversity and Inclusion](#): 701-777-6985
- [Food For Thought Pantry](#): (Wilkerson Commons Room 169; 701-777-4200)
- [National Suicide Prevention Lifeline](#): (1-800-273-8255)