Fond du Lac Tribal and Community College
COURSE OUTLINE FORM

03/19/19

Please return this form to the college vice president of academic affairs and the chairperson of the Academic Affairs and Standards Council (AASC)

1. Prepared by:_____

2. Date submitted:_____

3. Date approved:_____05/09/08_____   Date revised____1/26/2022____

4. Department/discipline:_____GIS_____

5. Department(s) endorsement(s):_____
   (Signatures of the person(s) providing the endorsement are required.)

6. Course Title:____Remote Sensing of the Environment_____
   Abbreviated course title for Transcripts (25 characters or less):_____

7. Course Designator:_____GEOG_____   8. Course Level:_____2030_____

9. Number of Credits: Lecture_____2_____   Lab____2_____

10. Control Number (on site)_____25_____   Control Number (online)_____20_____

11. Catalog/Course description:

   This course explores the fundamental concepts and applications of remote sensing. Students will investigate land-cover patterns of physical and social environments spatially and historically through laboratory activities. Course topics include electromagnetic principles, sensors and their characteristics, imagery data sources, image analysis, image classification and interpretation, LiDAR, and integration with GIS. (Meets MnTC goal area 3)

12. Course prerequisite(s) or co-requisite(s): Accuplacer scores/ Other courses
    Prerequisite(s):
    Co-requisite:

13. **Course Materials (**Recommended course materials and resources. List all that apply, e.g. textbooks, workbooks, study guides, lab manuals, videos, guest lecturers).

   1. Text: Determined on a yearly basis depending on availability and content, as noted in the syllabus.
   2. Additional Resources:
      a. Natural Resources Canada. (2014). Tutorial: Fundamentals of Remote Sensing. Online text
      b. GIS Lab (Room 208) with Esri ArcGIS Pro and additional image analysis software as needed installed on networked PCs
      c. Unmanned Aerial Vehicle (drone) for aerial image acquisition and photogrammetry
      d. Online software tutorials and resources
      e. Esri ArcGIS Online organizational account with student access
      f. Supplemental articles, videos, and case studies

14. **Course Content** (Provide an outline of major topics covered in course)

1. History and applications of remote sensing
2. Electromagnetic spectrum
3. Data collection platforms (i.e. satellites, photographic sensors)
4. Aerial photography
5. Photogrammetry
6. Image interpretation
7. Digital image manipulation
8. Radar
9. Lidar
10. Image classification
11. Vegetation indices

15. **Learning Goals, Outcomes, and Assessment**
    At FDLTCC we have 4 Competencies Across the Curriculum (CAC) areas. They are as follows:

    A. Information Literacy (the ability to use print and/or non-print tools effectively for the discovery, acquisition, and evaluation of information.)
    B. Ability to Communicate (the ability to listen, read, comprehend, and/or deliver information in a variety of formats.)
    C. Problem Solving (the ability to conceptualize, apply, analyze, synthesize, and/or evaluate information to formulate and solve problems.)
    D. Culture (knowledge of Anishinaabe traditions and culture, knowledge of one's own traditions and culture, knowledge of others' traditions and cultures, culture of work, culture of academic disciplines and/or respect for global diversity.)

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

Learning Outcomes	Competencies (CAC)	Cultural Standards
Demonstrate knowledge of the electromagnetic spectrum.	A, B, C	1
Collect, manipulate, and analyze reflectance data.	A, B, C	1,4
Perform land cover classification.	B, C	4
Distinguish between different image acquisition platforms.	B	1
Demonstrate the ability to use image analyst software to produce meaningful products.	C	1, 4
Identify real-world applications of remotely sensed images and analysis by organizations such as NASA.	A, B, D	1, 4
Integrate remotely sensed imagery into a GIS.	C	4

Demonstrate the ability to assess the data needs to complete projects in different geographic locations.	B, C	1, 4
Apply calculations to remotely sensed imagery to create information about the content of the image, such as rendering an NDVI to determine vegetative health.	C	1, 4
Compare processed data output with views on landscape and change, such as through a change analysis.	C, D	1, 4

WINHEC Cultural Standards:

1. **GIKENDAASOWIN – *Knowing knowledge:*** To develop human beings who value knowledge, learning, and critical thinking and are able to effectively use the language, knowledge, and skills central to an Ojibwe-Anishinaabe way of knowing.
2. **GWAYAKWAADIZIWIN – *Living a balanced way:*** To develop balanced human beings who are reflective, informed learners who understand the interrelatedness of human society and the natural environment, recognize the importance of living in harmony with creation, and are able to apply a systems approach to understanding and deciding on a course of action.
3. **ZOONGIDE'EWIN – *Strong hearted:*** To increase the students' capacity to live and walk with a strong heart, humble and open to new ideas and courageous enough to confront the accepted truths of history and society.
4. **AANGWAAMIZIWIN – *Diligence and caution:*** To develop students' capacity to proceed carefully, after identifying, discussing, and reflecting on the logical and ethical dimensions of political, social, and personal life.
5. **DEBWEWIN – *Honesty and integrity:*** To increase students' capacity to think and act with honesty and integrity as they understand and face the realities of increasingly interdependent nations and people.
6. **ZAAGI' IDIWIN – *Loving and Caring:*** To encourage students' acceptance of the diversity within their school, community, and environment by developing healthy, caring relationships built on respect for all.
7. **ZHAWENINDIWIN – *Compassion:*** To expand students' knowledge of the human condition and human cultures and the importance of compassion especially in relation to behavior, ideas, and values expressed in the works of human imagination and thought.

16. **Minnesota Transfer Curriculum (MnTC):** List which goal area(s) – up to two – this course fulfills.

    See www.mntransfer.org

    Goal Area(s):_____
    Provide the specific learning outcomes as listed on the mntransfer.org website that pertain to this course.

17. Are there any additional licensing/certification requirements involved?

          Yes   No

Provide the required documentation to show course meets required licensing/certification standards.

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