Statement of Work for Graduate Course Creator

Overview

This course is intended to provide an understanding of spectrum management to individuals with a bachelor's degree in physics or astronomy. The course creator shall create a 2-credit graduate-level course that meets the learning objectives listed below. The course should contain 90 contact hours of instruction (lectures, reading, assignments, and assessments) broken into three modules. The course will be presented online and completed asynchronously with the possibility of some assignments being peer evaluated.

Learning Objectives

The course should be designed so it meets the following learning objectives.

- Students will be able to describe the structure and responsibilities of national and international agencies associated with spectrum management.
- Students will be able to interpret allocation tables and will understand how frequencies are assigned to specific uses.
- Students will understand how radio frequency (RF) waves are produced by both natural and manmade transmitters and propagate through space. They will be able to explain how those waves are received at the antenna.
- Students will be able to detect, identify, and locate causes of RF interference and will be able to provide recommended solutions in mitigating the source (s) of interference.
- Students will create responses to proposed FCC rules and will be able to explain how those comments fit into the process of the FCC Rulemaking process.
- Students will be able to identify the value of how spectrum supports the needs of their mission and determine methodologies for sharing spectrum with other users without compromising their mission's objectives.

Concepts to be included

- Spectrum Management terms
- National agencies (FCC, NTIA) and International agencies (ITU)
    - structure
    - responsibilities
- Standards governing boards and how to become a member
- Allocation tables
    - interpretation
    - How spectrum is assigned
- the FCC Rule Making Process
    - Students will practice creating comments on FCC rules

- Competition
    - Identifying users of the spectrum
        - include some contemporary case studies
    - spectrum sharing
    - negotiation
    - value of spectrum
- Engineering units
- Antennas
- Propagation
- Introduction to Fourier Transform
    - negative frequency
- Receivers/Transmitters
- Filtering
- Link Budgets
- Interference
    - Typical Causes
    - Students will go through the process of detecting, identifying and locating interference in RF data

Timeline for Task Completion

- August 2024
    - TBD - Meeting to discuss NRAO's vision for the course. Also during this meeting, the course outline submitted during the application process will be discussed.
- September 2024
    - Sept. 16, 2024 – The final draft of the course outline is due.
    - TBD – Meeting to discuss the timeline for completing the first draft of module one.
- October 2024
    - Oct. 7, 2024 – The first recorded lecture and supporting documents are due.
    - TBD – Meeting to discuss progress and necessary revisions to formatting.
- November 2024
    - TBD – Meeting to discuss progress.
    - Nov. 25, 2024 – The first draft of module one is due.
- December 2024
    - TBD – Meeting to discuss the revisions for module one.
- January 2025
    - Jan. 7, 2025 – The final draft of module one is due.
    - TBD – Meeting to discuss the timeline for completing the first draft of module two.

- February 2025
    - TBD – Meeting to discuss progress.
- March 2025
    - March 17, 2025 – The first draft of module two is due.
    - TBD – Meeting to discuss feedback on module two.
- April 2025
    - April 18, 2025 – The final draft of module two is due.
    - TBD – Meeting to discuss the timeline for completing module three.
- May 2025
    - TBD – Meeting to discuss progress.
- June 2025
    - June 30, 2025 The first draft of module three is due.
    - TBD – Meeting to discuss feedback on module three
- July 2025
    - Meeting to discuss progress.
- August 2025
    - August 8, 2025 – The final draft of module three is due.
    - TDB – Meeting to discuss uploading materials to SuperKnova.

- September 2025
    - In collaboration with NRAO staff all materials are uploaded to SuperKnova and the course is created.

Statement of Work

The selected course creator will complete the following tasks:

- Attend all meetings included on the timeline.
- Use the provided list of learning objectives to develop a detailed outline for a 2-credit graduate-level course that consists of three modules. This course should contain 90 contact hours of instruction
- Create the materials required for that course including recorded lectures, descriptions of reading assignments, instructions for student activities, and assessments that consist of multiple choice, true/false, fill-in-the-blank, and other question types that can be computer graded.
- Revise the created modules in response to stakeholder feedback.
- Collaborate with NRAO staff to upload materials to SuperKnova

Please provide the following:

- CV (If the application filer is a team provide CVs for each team member)

- A list of three references (If the application filer is a team provide references for each team member)
- A budget for the project

An outline for the course. You do not have to include specific reading assignments or activities but you should provide a description of the content included in that task. You should provide a list of concepts covered in each recorded lecture. The outlined curriculum must meet the learning objectives listed above and include the listed concepts. In addition, you may add one learning objective and the associated content if it helps you fully develop the course. You are limited to five pages for the outline.