

***“EXCELLENCE THROUGH COLLABORATIVE COMMUNITIES OF LEARNERS”***

**AURORA UNIVERSITY SYLLABUS**

**Course Number: NSM 5408**

**Course Title: TRAC Teacher Research Program**

**4.5 Semester Hours Graduate Credit**

**1. Catalog Description**

This course is available to participants in teacher research projects at Fermi National Accelerator Laboratory. This course introduces secondary school teachers to research techniques and the contextualized science in a premier laboratory environment. Teachers become members of research groups and are assigned to tasks that match their backgrounds and stated areas of research interest.

**2. Course Overview/Course Teaching Methods**

Participants spend eight weeks as members of a Fermilab research team. The team members can include staff and university scientists, engineers, technicians as well as undergraduate and graduate students. The team determines the research topics and develops a work plan. Mentor scientists lead each research team. Teacher participants in these teams have two roles: active contributors to the research effort and professional educators who seek ways to adopt the research topics for classroom presentations during the following academic year.

Teaching methods include laboratory bench time, supplemented with small discussion sections and occasional lectures.

**3. Student Learning Objectives/Illinois Content or Teaching Standards Addressed**

As a result of this course, participants will:

- Participate in a professional scientific or engineering research experience under the direction of a mentor scientist.
- Increase their awareness and understanding of current science and technology research through their participation.
- Prepare a plan to facilitate the transfer of this knowledge to the classroom.

The course will identify the following Illinois Teaching Standards:

- The teacher understands the central concepts, methods of inquiry, and structures of the discipline(s) and creates learning experiences that make the content meaningful to all students.

- The teacher is a reflective practitioner who continually evaluates how choices and actions affect students, parents, and other professionals in the learning community and actively seeks opportunities to grow professionally.

#### **4. Units of Work/Text and Required Reading**

The mentor scientist assigns units of work and readings. Units of work include assignments and tasks appropriate to the context of the research. While the specific, contextualized science topics are unique to each research assignment, all participants will explore the habits of mind. Readings include articles, manuals and texts appropriate to the context of the research necessary for scientific research. These include abilities to:

- Design and conduct scientific investigations.
- Use technology and mathematics to improve investigations and communications.
- Formulate and revise explanations and models using logic and evidence.
- Recognize and analyze alternative explanations and models.
- Communicate and defend a scientific argument.

#### **5. Class Assignments**

Each participant will submit a written report describing their research assignment and any associated findings. Each team member will also submit a written classroom transfer plan indicating how they plan to transfer their summer research experience to the classroom. The classroom transfer plan will include the student activity and a description of the classroom context, teaching methods and objectives that the students will achieve in the activity.

#### **6. Evaluation and Procedures**

Participation, presentations and reports are all equally weighted.

- A (4 quality points per course unit) Excellent. Denotes work that is consistently at the highest level of achievement in a graduate college or university course and is realized with a score of >17 on the included rubric.
- B (3 quality points per course unit) Good. Denotes work that consistently meets the high level of college or university standards for academic performance in a graduate college or university course and is realized with a score of 16-17 on the included rubric.
- C (2 quality points per course unit) The lowest passing grade. Denotes work that does not meet in all respects college or university standards for academic performance in a graduate college or university course and is realized with a score of 14-15 on the included rubric. A “C” is the lowest passing grade.

F (0 quality points per course unit) Failure. Denotes work that fails to meet the graduate college or university standards for academic performance in a course and is realized with a score of <14 on the included rubric.

<i>A</i> <i>4 points</i>	<i>B</i> <i>3 points</i>	<i>C</i> <i>2 points</i>	<i>F</i> <i>1 point</i>
Participate actively and regularly within group work by offering ideas and asking questions.	Participate actively and regularly within group work by offering ideas or asking questions.	Generally participate within group work by offering ideas and asking questions.	Rarely participate within group work.
Offer appropriate comments within group discussions and articulate constructive criticism as needed.	Offer appropriate comments within group discussions, and articulate constructive criticism as needed.	Offer comments within group discussions and makes an effort to articulate constructive criticism as needed.	Offer minimal comments within group discussions and makes little effort to articulate constructive criticism.
Complete a written report that demonstrates a mastery of the scientific content and demonstrates exemplary use of the written word.	Complete a written report that demonstrates a mastery of the scientific content or demonstrate exemplary use of the written word.	Complete a written report that demonstrates neither a mastery of content nor a grasp of the written word.	Written report is missing.
Complete final project, which demonstrates a mastery of content and engages students in inquiry techniques.	Complete final project but mastery of content or engagement of students in inquiry techniques is not evident.	Final project is complete, but not well written nor engaging with regard to student inquiry.	Classroom transfer project is missing.
Design a classroom transfer project that engages the students with data encountered during the research work.	Design a classroom transfer project that engages students with ideas and concepts encountered during the research work.	Design a classroom transfer project that engages students with stories and photographs descriptive of the research work.	Classroom transfer project is missing.

### 7. Attendance Policy

Participants are expected to regularly appear and participate during the workday activities of the research group. The supervising scientist mentor must approve any absences.

### 8. Academic Honesty and Integrity Statement

Students are expected to maintain academic honesty and integrity as students at Aurora University by doing their own work to the best of their ability. Academic dishonesty (cheating, fabrication, plagiarism, etc.) will result in the student receiving a zero for that test, assignment or paper.

**9. Final Examination Policy**

The culminating activity in this course is the written report and classroom transfer plan described in section 5 of this document.

**10. American Disability Act Compliance**

In compliance with ADA guidelines, students who have any condition, either permanent or temporary, which might affect their ability to perform in this course, are encouraged to inform the instructor at the beginning of the course. Adaptations of teaching methods, class materials, including text and reading materials or testing, may be made as needed to provide for equitable participation.

**11. Bibliography**

Bibliographies are prepared by each mentor and are specific to each research assignment.