I. Education 363: Teacher Laboratory – Elementary Methods Science Component

II. 1 ½ Credit Hours

III. Course Description:

The Teacher Laboratory emphasizes the preparation for the teaching of science, mathematics, social studies, and music. The student is involved with others in the process of continual development of attitudes, knowledge and skills needs by classroom teachers as they plan, present and evaluate their lessons and class management. Development of attitudes conducive to projection of a professional image is also an important part of the laboratory experiences. This component emphasizes science content and methodology.

IV. Place of course in curriculum: Teacher Laboratory is part of the Professional Semester

V. Course Goals and Objectives:

A. Goals – The science component of the Teacher Lab has several goals:

1. Identifies science as processes of investigation, separate from the body of knowledge, which is the result of previous scientific inquiry. (T5, LR5)

2. Emphasizes the importance of direct student involvement with the processes of nature in learning how to learn through scientific inquiry. (T2, T6, LD3)

3. Relates various modes of learning to the teaching of science, *viz*.: (T5, T8)

    a. Kinesthetic, *i.e*.: "getting one's hands dirty" in the process of learning.
    b. Visual, *i.e*., making direct observations
    c. Logical thought, *i.e*., cognitive learning

Provides actual practice to the teacher candidate in learning science through implementation of the inquiry process. Scienceing is taught by modeling and actual practice. (T2, LR2)

B. Objectives – As a result of the experience of the science component in the Teacher Lab, the teacher candidate will be able to:

1. Identify current trends in science education at the elementary school level. (T5, LD3, LR7)

2. Propose and develop activities, which may be utilized in the teaching of science, which provide inquiry based scienceing experiences for elementary students at a variety of developmental and exceptionality levels. (T1, T2, T3, T8, LD3)

3. Develop instructional strategies to involve students in the processes of science in the various areas of traditional science content, *e.g.*: (T2, T4, T6)

    a. Life sciences, *i.e.*, skeletal structures, health, plants and animal ecology, cell structures.

    b. Physical science phenomena, *i.e.*, properties of light, sound, electricity, and mechanics.

    c. Chemical systems, *i.e.*, properties of substances, care and safety in handling and disposal of hazardous wastes.

    d. Earth and the Solar System, *i.e.*, rocks, minerals, climate, weather, ecology, and astronomical studies

4. Integrate mathematics skills in the teaching of science involving such processes (but not limited to) as measuring, identifying patterns, and developing spatial skills. (T5, LD3)

5. Develop lesson plans and activities that address Nebraska science standards and professional standards. (T1, T5)

6. Demonstrate knowledge and understanding of the concepts, skills, and processes of reading , writing, science, social studies, and math as defined in the Nebraska Content Standards for first, fourth, eighth, and twelfth grades. (T2, LD1, LD2, LR7)

VI. Content

A. Content – the content areas have been enumerated under Objectives above in V-B-3. These areas are further enlarged upon below. Specific topics for the course are chosen from the following: (T5, T7, LD3, LR3, LR7)

1. Densities of solutions
2. Geologic substances
3. Light and optics
4. Geologic weathering processes
5. Behavior of zoological specimen
6. Buoyancy
7. Objects and sound production
8. Cosmologies
9. Life cycles

    Animals, *e.g.*, frogs
    Plants, *e.g.*, peas and/or beans
    Seeds and harvest

10. Plants and animals

11. Human body
12. Astronomical cycles
    - Positions of the sun
    - Positions of the moon
    - Positions of other planets
13. Structures, *i.e.* how are things built and why?
14. Measuring
15. Estimating
16. Using measurements

VII. Methodology

A. Methodology – The methodology of each of the "area" sections listed below include involving the candidates in the actual process of inquiry into the subject at hand. (T1, T2, T3, T4, T5, T6, T7, T8, LR7)

The instructional strategies include, but are not limited to those listed below. It should be pointed out that a particular instructional strategy is chosen for its usefulness in the scientific inquiry being performed rather than for its pedagogical value in the Teacher Lab Session, therefore, the main pedagogical strategy being utilized in the Teacher Lab Science Component is "modeling good science teaching" while actively engaged in scientific inquiry. The activities themselves are carried out using: (T2, LD1, LD3, LD10, LR2, LR5)

- Small group activities
- Large group discussions
- Manipulation of materials of nature
- Formulating hypotheses
- Proposing tests for hypotheses
- Peer teaching

Additionally, various web resources are used to show actual science lessons using specific techniques, as well as dry-marker erase whiteboard, and many handouts for data recording and future reference, *etc.* (T3, T5, T8, LR6)

VIII. Student Roles

Activities are provided which are designed to involve the teacher candidate in learning using the specific processes of science indicated in each of the content areas listed above, *i.e.*, the candidate assumes both the role of a learner and that of a professional in training simultaneously. (T1, T2, T4, T5, T9)

Each candidate is required to teach/model a lesson for her/his peers. (T2, T4, T8, T9, LD1, LD2, LD3, LR7)

IX. Evaluation

The evaluation of the candidate in this component of *The Teacher Lab* is based upon the level of involvement he/she demonstrates in the activities provided for the achievement of each of the objectives given above. (T5, T8, T98, LD2, LD3, LD5, LR2, LR5, LR7)

X. Selected Bibliography

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Martin, Ralph E., Jr., *et.al. Teaching Science of All Children*. Boston: Allyn and Bacon. 1994.

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Wlodkowski, Raymond J. and Margery B. Ginsberg. *Diversity & Motivation*. San Francisco: Jossey-Bass Publishers. 1995.

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