NAVAJYOTHI COLLEGE OF TEACHER EDUCATION FOR WOMEN, OLARIKKARA

VAC. EDU. 07: EXPERIMENTAL PHYSICAL SCIENCE FOR SECONDARY SCHOOL TEACHERS

Contact Hours: 36 (Instruction)

Maximum Marks: 100 (Theory - 40; Practical – 40; Internal – 20)

Programme Outcome

PO 01: Master in pedagogical knowledge, professional competencies and skills to become as a competent teacher

Course Learning Outcomes

On the successful completion of the Course, the learner will be able to,

1. Understand the techniques and methods of preparing improvised equipments for physical science laboratory
2. Understand the systematic steps involved in the experiments of secondary school physical science curriculum
3. Understand the systematic steps involved in the preparation of reagents and chemicals of physical science laboratory
4. Understand the steps involved in the systematic use of experimental tools and laboratory equipments in physical science laboratory
5. Understand the systematic laboratory rules and First Aids in Physical science Laboratory

Unit I: Introduction to Physical Science Laboratory

Physical science Laboratory - Nature - Characteristics - Requirements - Infrastructure - Organization of Laboratory **(05 Hours)**

Unit II: Maintenance of Physical Science Laboratory

Purchase and Maintenance of Chemicals - Apparatus and Equipments -Various Registers in the Laboratory - Laboratory Rules **(05 Hours)**

Unit III: Precautions and First Aid in Physical Science Laboratory

Types of Accidents occuring in Physical Science Laboratory - Physical Injuries - Acid Burn - Alkali Burn - Skin Problems due to Chemical reactions - Poisoning Gases - Poisoning due to Chemical Sustances - Poisoning due to Organic compounds - Burns due to Organic compounds - First Aid for accidents in Laboratory - Chemicals used for First Aid and their preparation **(08 Hours)**

Unit IV: Preparation of Reagents and Chemical compounds in Physical Science Laboratory

Preparation of Acids and Bases for Various Normalities and Molalities - Preparation of various Reagents - Nesslers reagent, Ferrous sulphate solution, Sodium Nitro prusside solution, Acquaregia, Liquour ammonia, Tollens reagent, Silver nitrate solution etc. - Preparation of Developer, Mordents and Dies **(09 Hours)**

Unit V: Preparation of Improvised Laboratory Aids in Physical Science Laboratory

Preparation of Still Models in Physics for Upper primary curriculum - Preparation of Working Models in Physics for High School curriculum- Preparation of Still Models in Chemistry for Upper Primary Curriculum - Preparation of Working Models in Chemistry for High School Curriculum **(09 Hours)**

Mode of Transaction

Lecture, Demonstration, Discussions, Hands – on Activities, Workshops

Task and Assignments (Any two)

1. Demonstrate any two First Aids in Physical Science Laboratory supported with explanation and a Brief Report with Geo tagged Photo for the same
2. Prepare any Laboratory Reagent used in Science Laboratory along with a brief report explaining the preparation and chemical activities of the reagent
3. Prepare one still Model and Working Model each from Physics and Chemistry from High School Physical Science along with a Report explaining the aim, principle and procedure

References

Mollykutty, K.M., & Mathew, T.K. (2020). Theoretical Bases of Science Teaching. Rainbow Publishers.

Evaluation System

1. Continuous Evaluation

In the continuous evaluation mode, the course provides the student teacher to complete two tasks related to the course within the stipulated time. Each task is for 5 Marks and the split up of this 5 Marks is as following;

Sl. No.	Criteria	Marks
1	Timely Submission	1
2	Systematic structure	3
3	Task writing style	1
Total Marks		5

There will be two internal test papers of 5 Marks each during the first and second half of the course. The Marks for the internal examinations will be given as per the following criteria;

Sl. No.	Criteria	Marks
1	80 percentage and above	5 Marks
2	60 percentage to 79 percentage	4 Marks
3	40 Percentage to 59 percentage	3 Marks
4	Below 40 percentage	2 Marks

Thus the total distribution of Internal Mark is as per the following table;

Sl. No.	Items	Marks
1	Task 1	5
2	Task 2	5
3	Internal Examination - I	5
4	Internal Examination - II	5
Total		**20**

A minimum of 10 Marks in the Continuous Evaluation mode is necessary to attend the External theory and practical examination.

2. External Evaluation

The external evaluation consists of both Theory and Practical Examination. The theory Examination is for a total of 40 Marks and Practical Examination is also for a total of 40 marks.

2.1 Theory Examination

The theory Examination is for a total of **40** Marks. The question paper consists of three parts such as part A, part B and part C. Part A consists of **7** short answer questions out of which the student has to attend any **5** questions. Each question carries **2** Marks. Part B consists of **7** Paragraph writing Questions out of which the student has to write **5** questions. Each question carries **4** Marks. Part C consists of **2** Essay questions out of which the student has to attend any **one**. Each question carry **10** Marks. The minimum marks for a pass is **20**.

2.2 Practical Examination

The practical examination is for a total of **40** marks. The practical examination consists of 2 items each having **20** marks. The first item will be for the preparation of a

definite volume of solution with specific Normality and a chemical laboratory reagent. The second item includes the preparation of one still and working Model in Physics or Chemistry with Appropriate Aim, Principle, Procedure and Classroom Application.

Grading and Result Declaration of the Course

The Total grade of the course is determined by adding together the internal evaluation and external evaluation. Those who successfully complete the value added course are given grades according to their total score percentage as shown in the below table.

Sl. No.	Range of Total Scores (%)	Grade
1	90 - 100	A+
2	80 - 89	A
3	70 - 79	B+
4	60 - 69	B
5	50 – 59	C+
6	40 - 49	C
7	Below 40	D+