

B.Ed OPTIONAL COURSE

BIOLOGICAL SCIENCE – I

OBJECTIVES

At the end of the course, the student- teachers will be able to

- understand the basic principles and practices of Science Education relevant to teaching Biological Science in the Secondary and Higher Secondary Classes
- learn appropriate teaching techniques
- acquire adequate skills in using proper and suitable methods of teaching biology
- acquire knowledge relating to the organization and administration of Biology Laboratory, curricular and co curricular activities that would promote the teaching of Biology and develop in pupils the scientific attitude and a sense of appreciation and interest in Biology
- acquire skill in constructing tests
- develop ability to construct a curriculum and to evaluate critically the present curriculum
- develop skills in preparing and using the appropriate instructional material in Biology

UNIT I Place, Goals and Objectives Of Biology

Biology in the school curriculum – its claims for inclusion – Interdisciplinary approaches in the school curriculum – Various branches related to Life Science.

Goals and objectives of teaching Biology with reference to Bloom's taxonomy- Cognitive, Affective and Psychomotor Domains. Aims of teaching Biology at different levels – Primary, Secondary and Higher Secondary.

UNIT II Lesson and Unit Planning

Lesson planning – Importance of lesson plans- Writing Instructional Objectives- Planning for specific behavioral changes. Preparation and use of unit plan – Teaching and Teaching aids Evaluation, Recapitulation and Assignments.

UNIT III Microteaching

Microteaching - Definition- Microteaching Cycle- Types of Skills- Skill of Introducing, Skill of Explaining, Skill of Stimulus variation, Skill of Questioning, Skill of Demonstration, Skill of Reinforcement, Skill of Achieving Closure- Link lesson – Definition – Need for Link lesson

UNIT IV Methods of Teaching Biology

Criteria for selection of a method: Level of the class, size of the class, available time and subject matter. Approaches – Inductive, Deductive, Analytic, Synthetic, Heuristic, Dalton Plan.

Instructional technology and its application to the teaching of Biology , Programmed instruction, Personalized instruction, Computer Assisted Instruction. Teaching Machines, Special methods – Lecture, demonstration, laboratory, project scientific methods, seminar , symposium, workshop, panel discussion, biographical and historical method, team teaching and assignment method

UNIT V Biology Laboratory

- (I) Practical work in Biology: Importance of practical work – organizing the work of the practical class – laboratory – Accidents and First Aid –safety – school Biology Record.
- (II) Museum – Importance of museum – Preparation of museum materials – Field trip. Maintenance of Aquarium, Vivarium & Terrarium.

UNIT VI Text Books

Qualities of a good Biology text book – Criteria for evaluating a biology book- Use of text books in teaching biology - Values of a school Biology library – Books for selection and purchase-classification and cataloging.

UNIT VII Curriculum in Biology

Principles of curriculum development – Selection of content and organization of subject matter- NCERT Curriculum – BSCS and Nuffield Secondary Science Project

UNIT VIII Educational Technology

Projected Aids – Audio Visual Aids - Audio Video Players – Tapes and CDs, OHP and transparencies – Slide and Film Projectors -Radio and TV (Broadcast and Telecast), CCTV, Multimedia Computers, Power Point. Non Projected aids – Charts – Models – (Static and working), Flash cards, Pictures, Chalk, Flannel, Magnetic and Bulletin Boards – Exhibits, CAI, Internet, e-learning etc;

UNIT IX Science Teacher

Academic qualification – professional training and special qualities required for a biology teacher- inservice training. Class Room Climate: Flanders interaction analysis

UNIT X Evaluation And Statistics

- (i) Test and its types – Diagnostic, Prognostic and Achievement tests, Criterion and Norm referenced tests - Principles of test construction, Blue Print and Question bank.
- (ii) Evaluation of students attainment in Biology- Tools of evaluation – The written examination – Evaluation of the practical work in Biology - Marking – Interpretation of results.
- (iii) Various types of test items essays, short answer, completion, matching two choice, multiple choice, Steps in test construction, table of specification – scoring, interpretation and follow up.
- (iv) Measures of central tendency : Arithmetic mean, median , mode, Measure of Variability; range, quartile deviation, average deviation, and standard deviation use and interpretation.
- (v) Correlation – meaning and interpretation, co-efficient of correlation – rank difference method.
- (vi) Graphical Representation of Data – Bar & Pie Diagram, Histogram, Frequency Polygon, Cumulative Frequency curve Ogive, Percentile Ranks, Normal Probability curve & Kurtosis.

PRACTICALS

1. Making charts, improvised apparatus and models.
2. Practice of a minimum of 2 skills under microteaching (Proper records to be maintained)
3. Preparation of laboratory instruction cards.
4. Planning and conducting any four practical classes in Biology and maintaining a record of practical work.
5. Preparation of unit test for a unit in Biology.
6. Designing and carrying out of any one simple investigation of Biology.
7. Collecting and preserving biological specimens
8. Collecting and keeping plants and animals alive for instructional purposes: aquarium, terrarium and vivarium.

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