**Bachelor of Education (B.Ed. Special Education VI & ID )**

**Title of the Course: A5-Pedagogy of school subject .Part V : Science (Special reference to disability )**

**(Semester: 2)**

 **Credits: 4**

 **MM: 100 (External: 70 ; Internal: 30) Contact Week 15**

**Introduction of the Course**

Pedagogy of science for children with disability is a specialized and crucial aspect of education that aims to create an inclusive learning environment. Recognizing the diverse needs of students, this pedagogical approach tailors science education to accommodate various abilities, ensuring every child can actively engage in the learning process. Moreover, the pedagogy prioritises adaptive teaching strategies. Science teachers employ differentiated instruction, modifying content, process, and product to meet individual needs. This may involve providing additional support, alternative assessments, or customised learning materials. Collaborative learning environments are encouraged, where peer support and teamwork play pivotal roles in fostering social and academic growth. This course would pave the way for a more inclusive and enriching science education experience for all.

 **Learning Outcomes**

After completion of the course student will be able to:

1. explain the role of science in day to day life and its relevance to modern society.
2. describe the aims and objectives of teaching science at school level.
3. demonstrate and apply skills to select and use different methods of teaching the content of sciences.
4. understand scientific concepts through the use of hands-on, experiential methods tailored to individual learning styles and sensory preferences.
5. apply scientific thinking to real-world situations and demonstrate the ability to navigate challenges related to their unique learning profiles.
6. integrate technology and assistive devices to ensure access and utilise digital resources independently.
7. organise and plan laboratory facilities and equipment in inclusive schools.

**Unit I: Science Pedagogy** **(12 hours)**

* The concept "of technological , Pedagogical Content Knowledge (TPCK) and its implications for science teaching.
* Objectives of teaching science with special reference to the development of basic science process skills
* Methods of teaching science: Demonstration, discussion, investigatory projects, individually paced programmes, group work, peer learning, observation-based survey, problem solving, guided independent study, seminar presentation, action research etc.

 **Unit 2: lesson planning** **(12 hours)**

* Aims and objectives of teaching science at various levels of school education
* Bloom’s Taxonomy of Educational Objectives
* Lesson Planning –(with special reference to children with special needs).
* Remedial/Enrichment plans.
* Planning of science experiments and laboratory work.

 **Unit 3: Organization of the science Laboratory (12 hours)**

* Layout and design of the science laboratory in inclusive schools.
* Storage of apparatus, consumable and non-consumable items/materials
* Maintenance of laboratory records.
* Making arrangements for the conduct of experiments.
* Safety of scientific equipment with reference to children with disabilities

**Unit 4: Learning Resources with reference to Children with Disabilities for Teaching Science (12 hours)**

* Criteria for selecting/designing Teaching-Learning Resources: content based, learner based and context based.
* Textbook, reference books, encyclopaedia, newspaper and alike Improvisations and Science Kits
* Instructional aides, computer aided instruction in science, multi-media packages, interactive software, websites, digital resources, Open Educational Resources (OER) etc.
* Planning of extended experiences, science quiz, science fair, science corner/resource room, science club, excursion and related SUPW activities.
* Aquarium, Vivarium - Role in Teaching with Setting & Maintaining.
* Museum, Botanical And Zoological Garden: Role In Teaching Science.

**Unit 5: Assessment (12 hours)**

* Concept of Assessment, types of assessment, Critique of present pattern of examinations
* Assessment through creative expression-drawing, posters, drama, poetry, etc as part of formative assessment for continuous assessment of thinking and process skills
* Developing learner profiles and portfolios; participatory and peer assessment.
* Adaptations of Evaluation Procedure With Reference To Children With Disabilities
* Assessment of laboratory work.

**Practicum/ Suggested Projects / Assignments**

* Pedagogical analysis of a unit from Science content.
* Developing an Action Research Plan on a problem related to teaching and learning of Sciences to students with disabilities to students with disabilities.
* Construction of diagnostic tests along with a remedial plan.
* Comparative analysis of prescribed syllabus and textbooks of different Boards Curricular innovations in respective subject areas
* Curricular adaptations for teaching Sciences to students with disabilities.

**Suggestive readings**

Brown, R. (1978). Science instruction of visually Impaired Youth. New York: AFB.

Buxton, A. C. (2010). Teaching Science in Elementary and Middle School. NewDelhi: Sage Publications.

Bybee, R. (2010). The teaching of science: 21st-century perspectives. Arlington, VA: NSTA Press,USA.

Chander.S.(2017). Teaching science to learners with visual impairment.SR publication ,New Delhi.

 Joshi, S. R. (2005). Teaching of Science.New Delhi: A.P.H Publishing Corporation.

Lawson, E. A. (2010). Teaching Inquiry Science in Middle School, New Delhi: Sage Publications.

Mani, M. N. G. (1992). Techniques of teaching blind children, New Delhi: Sterling Publishers.

Mukhopadhyay, S., Jangira, N. K., Mani, M.N. G., & Raychowdhary, N. (1987). Sourcebook for training teachers of visually impaired, New Delhi: NCERT.

NIVH (1986). Handbook for the teachers for the visually handicapped, Dehradun

Sharma, R. C. (2005). Modern Science teaching, Delhi: Dhanpat Rai & Sons.

Tripathi, S. (2004). Teaching of Physical Science, Delhi: Dominant Publications.

Vaidya, N. (2003). Science Teaching in Schools, New Delhi: Deep & Deep Publishers.

Vanaja, M. (2006). Teaching of Physical Science, Hyderabad: Neelkamal Publications

Collette, T. Alfred. And Chiappetta, L. Engene. (1994) Science Instruction in the Middle and Secondary Schools, Macmillan Company.

Rao, V.K. (2004). Science Education, APH Publishing Corpn. New Delhi.

Wallace, John and Louden, William (2002) Dilemmas of Science Teaching, Routledge Publishers.

**Teaching Learning Process**

A blended approach of teaching learning would be adapted by integration of technology in the classroom to foster a deeper understanding of scientific principles facilitated by interactive simulations ,multimedia resources ,and digital tools. Innovative projects, Reflective expression and learning will be encouraged.

**Key words :**

**Science curriculum,Technological pedagogical and content knowledge, science kits**

**repertoire of teaching learning ,lesson plan,Remedial plan , Science laboratory**