**Bachelor of Education (B.Ed. Special Education)**

**TITLE OF THE COURSE: TECHNOLOGY AND EDUCATION OF THE LEARNER WITH VISUAL IMPAIRMENT**

**Course Code: C-15**

**(Semester: V)**

 **Credits: 4**

**MM: 100 (External: 70 Internal: 30)**

**Contact Week 15**

**Introduction of the Course**

 Technology in the form of adaptive and assistive devices, play a crucial role in the education of the Learners with visual impairment. This course brings into sharp focus the need and importance of such technologies both for the practicing teachers and the learners with visual impairment. While highlighting the significance of addressing the users point of view/feedback and involving mainstream professionals in developing required technologies, the course also dwells upon on how best students with visual impairment get access to the printed text/material. The course also acquaints the student-teachers with various devices for making the teaching-learning process for important school subjects meaningful, exciting and rewarding for all concerned. The educational needs of children with low vision and related technological perspectives are addressed, too, along with critical contributions of computer-aided learning and interventions.

In short, the course focuses on making transaction of curriculum for students with blind and low vision, a really enjoyable and worthwhile experience. It needs to be studied in conjunction with course Code C14 of the curriculum.

**Learning Outcomes**

After completing the course student-teachers will be able to

1. *Relate the concept and nature of educational technology and ICT to the education of children with visual impairment.*
2. *Acquire knowledge of the concept and nature of adaptive technology and explain underlying principles and techniques.*
3. *Get familiar with technologies for print-access for children with visual impairment.*
4. *Describe and use different technologies for teaching low vision children as also
various school subjects.*
5. *Design and utilize ICT based teaching-learning tools for inclusive classrooms with learners with VI.*
6. Design and implement effective instructional strategies for teaching core subjects and life skills to students with visual impairments.

**Unit 1: Introducing Educational and Information Communication Technology (12 hours)**

1. Educational Technology-Concept, Importance, and Scope
2. Difference between Educational Technology and Technology in Education
3. Significance and Goals of Technology for the Education of children with
Visual Impairment

1.4 Information and Communication Technology (ICT) - Concept and Special
Significance for teaching-learning of the visually impaired

1.5 Policy and programmes in Indian context related to use of ICT for learners with disabilities. NEP 2020, National Curriculum Framework 2023(for all levels), UNCRPD.

**Unit 2: Adaptive Technologies (12 hours)**

1. Concept and Purposes of Adaptive Technology
2. Universal and Inclusive learning Design - Concept, Advantages, and Limitations.
3. Issues and challenges related to Access, Affordability, and Availability in context of technology.
4. Technological tools for addressing issues and challenges related to learning.
5. Adaptive technology for addressing issues and challenges related to education of learners with visual impairment.

**Unit 3: Access for the Learners with Visual Impairment (12 hours)**

1. Screen Readers with Special Reference to Indian Languages; Magnifying Software,
and Open Source Software.
2. Braille Notetakers and Stand-alone Reading Machines
3. Braille Translation Software with Particular reference to Indian Languages and Braille
Embossers
4. Open Educational Resources (OER). On-Line Libraries and open online sharing platforms.
5. Daisy Books, Recordings, and Smart Phones.

**Unit 4: Assistive Technologies for the Learner with visual impairment with Reference to School Subjects (12 hours)**

1. Artificial Intelligence and pedagogy for learner with visual impairment.
2. Mathematics: ICT integrated devices and softwares like, Taylor Frame, Abacus, Geo Board, Algebra and Maths Types,
Measuring Tapes, Scales, and Soft-wares for teaching Maths.
3. Science: ICT integrated devices and softwares like, Thermometers, Colour Probes, Scientific and Maths Talking Calculators,Light Probes, and Weighing scales and Soft-wares for teaching Science.
4. Social Science: Tactile/Embossed Maps, Charts, Diagrams, Models of Different
Types, Auditory Maps, Talking compass, and GPS

4.4 Devices to address low vision: Optical, Non-Optical and Projective

4.5 Technology and Softwares for developing tactile
diagrams

**Unit 5: Digital Learning Tools and Platforms for Learners with Visual Impairment (12 hours)**

1. Assistive devices for communication, mobility, and orientation.
2. Promoting social-emotional well-being and self-advocacy skills for students with visual impairments. Social Media Platforms, Creation of Blogs, Conferencing etc.
3. Distance Learning and ICT
4. e-Classroom: Concept and Adaptations for Learners with Visual Impairment

**Any three of the following**

* Curate a list of devices, softwares and OERs for Social Science, Languages, Mathematics and Science that can be used for learners with visual impairment in special and inclusive setups.
* Make a short report (in about 500 words) on the advantages and limitations as well
as sources of availability in respect of any print-access technology indicated in Unit 3 above.
* Make a case study of a student with low vision at the secondary stage, indicating
clearly his educational needs and how you can address them using technological developments.
* Prepare a short note (in about 400 words) on various aspects of teaching your subject in an inclusive classroom (having learners with VI) and
how it could be made accessible to the learners with visual impairment.

**Essential Readings**

* Biwas, P. C. (2004). Education of children with Visual Impairment: in inclusive
education. Abhijeet Publication, New Delhi.
* Bourgeault, S. E. (1969). The Method of Teaching the Blind: The Language Arts,
Kuala Lumpur: American Foundation for the Overseas Blind.

Chander, S.(2017). Teaching science to learners with visual impairment / Subhash Chander.-- New Delhi : SR Publishing House, ISBN : 978-93-82884-66-8.

* Chander, S.(2018). *Developments in Information and Communication Technology for Inclusive Education:Issues of Access and Pedagogy. In Psychological and Sociological Perspectives in Diversity and Inclusion:An Anthrology for Researchers and Practictioners. Ed. By Saxena, V. and Kumar, S. . Kanishka Publication.Delhi*
* Chander S. and Patra G. (2021). Education of Children with Disabilities: Exploring Possibilities with Artificial Intelligence. Pedagogy of Learning, 7 (3), 29-35.

Chander, S. and Chetna Arora (2020).Integrating Technology into Classroom Learning. Indian Journal of Educational Technology.CIET, NCERT. Volume 2. Issue 1.

* Chaudhary, M. (2006). Low Vision Aids. Japee Brothers, New Delhi.
* Lowenfeld, B. (1973). The Visually Handicapped Child in School. John Day
Company, New York.
* Mani. M.N.G. (1997).Amazing Abacus. Coimbatore: S.R.K. Vidyalaya Colony.
* Mukhopadhyay, S., Mani, M.N.G., Roy Choudary, M., & Jangira, N.K. (1988).
Source Book for Training Teachers of Visually Impaired. New Delhi: NCERT.
* Proceedings: Asian Conference on Adaptive technologies for the Visually Impaired
(2009). New Delhi: Asian Blind Union
* Punani, B., & Rawal, N. (2000). Handbook for Visually Impaired. Blind Peoples'
Association, Ahmedabad.
* Scheiman, M., Scheiman, M., & Whittaker, S. (2006). Low Vision Rehabilitation: a
practical guide for occupational therapists. Thorefore Slack Incorp, New Jersy.
* Scholl, G. T. (1986). Foundations of the education for blind and visually handicapped
children and youth: Theory and Practice. AFB Press, New York.
* Singh, J. P. (2003). Technology for the Blind: Concept and Context. Kanishka
Publication, New Delhi.
* Vijayan, P., & Gnaumi, V. (2010). Education of Children with low Vision. Kanishka
Publication, New Delhi.

**Suggested Readings**

* Chander, S. and Arora, C. (2019). Connectivism Pedagogy and Virtual Learning Environment-Two Sides of the Same Coin. Distance and Open Learning:Challenges and Opportunities in the current Scenario. Published by Jamia Millia Islamia. 978-81-943147-4-5
* Fatima, R. (2010). Teaching aids in mathematics; a handbook for elementary teachers.
Kanishka Publication, New Delhi.
* Hersh, M.A., & Johnson, M. (2008). Assistive Technology for Visually Impaired and
Blind People. Springer, London.
* Sadao, K. C., & Robinson, N. B. (2010). Assistive Technology for young children:
creating inclusive learning environments.Paul H Brooks, Baltimore.

Teaching Learning Resources (Digital and others): Across Units (If any)

Open Source Initiative for Visually Impaired (OSIVI): [https://www.whoi.edu/what-we-do/understand/departments-centers-labs/aope/aope-project-highlights/](https://www.whoi.edu/what-we-do/understand/departments-centers-labs/aope/aope-project-highlights/%22%20%5Ct%20%22_blank)

* Bharat Accessible e-Library (BaEL): [https://depwd.gov.in/](https://depwd.gov.in/%22%20%5Ct%20%22_blank)
* India Accessibility Solutions (IAS): [https://www.watnx.com/accessbility\_consulting.html](https://www.watnx.com/accessbility_consulting.html%22%20%5Ct%20%22_blank)
* Project Gutenberg Hindi: [https://www.gutenberg.org/](https://www.gutenberg.org/%22%20%5Ct%20%22_blank) (Provides access to Hindi ebooks in DAISY format)
* CAST: Center for Applied Special Technology: [https://www.cast.org/](https://www.cast.org/%22%20%5Ct%20%22_blank)
* UDL Center at CAST: [https://udlguidelines.cast.org/](https://udlguidelines.cast.org/%22%20%5Ct%20%22_blank)
* W3C Web Accessibility Initiative (WAI): [https://www.w3.org/WAI/](https://www.w3.org/WAI/%22%20%5Ct%20%22_blank)

**Teaching Learning Process**

The course will be taught through exploratory and interactive pedagogic methods such as classroom discussion, debates,discussions, critical media analysis, collaborative learning tasks which enhance reading comprehension of core writings in the area and innovative projects.

Students will be encouraged to write their blogs and engage in resource curation and resource development for the learners with Visual Impairment. They would be encouraged to explore the research done in the field across the globe and in Indian context.

**Key words : Learners with visual impairment, inclusive education, adaptive technology, information and communication technology, technology, artificial intelligence.**