



Bachelor of Education (B.Ed. General)  
Semester-II

Course Code	UE02GBED59	Title of the Course	CPS-6 : Pedagogy of Science
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	<ol style="list-style-type: none"><li>1. The student-teachers compare different approaches of teaching science.</li><li>2. The student-teachers construct lesson plans following inquiry approach and constructivist approach.</li><li>3. The student-teachers perform classroom practices through demonstration and experimental method.</li><li>4. The student-teachers evaluate science textbooks of standard VIII and IX.</li><li>5. The student-teachers formulate science club and arrange various activities under it.</li><li>6. The student-teachers arrange programmes like sky gazing and visit to botanical garden.</li><li>7. The student-teachers evaluate competences and professional duties of science teacher.</li></ol>
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Course Content		
Unit	Description	Weightage* (%)
1.	<b>Pedagogical Dimensions of Teaching Science</b> A. Approaches of teaching science <ol style="list-style-type: none"><li>1. Inquiry approach: concept, steps, role of teacher and learner</li><li>2. Constructivist Approach : 5E Model, Developing lesson plan as construction of knowledge following 5E Model</li></ol> B. Methods of teaching science <ol style="list-style-type: none"><li>1. Demonstration method: Concept, Demonstration of experiment, merits and demerits</li><li>2. Experiment Method : Concept steps merits and demerits</li></ol> C. Textbook and Assessment <ol style="list-style-type: none"><li>1. Evaluation of science textbook</li><li>2. Assessment in science : Techniques of formative assessment</li></ol>	35





	D. Self Learning Approaches and Methods in learning science 1. Tinkering lab : Concept 2. Exploring ATAL Tinkering lab	
2.	<b>Science Teacher and Learning Resources</b> A. Competencies of science teacher 1. Role of a science teacher in teaching science 2. Professional development of a science teacher B. Field Experiences and Learning Resources 1. Botanical Garden : Organization and Implications 2. Sky Gazing : Organization and Implications C. Extension Activities 1. Science Club : Objectives and Activities 2. Science Exhibition / Science Fair : Objectives and Activities D. Self Learning 1. Reading and review of NCF national focus group position paper (2005) on teaching of science 2. Developing lifelong learning attributes through teaching learning of science	35
3.	Textbook of Class 9 (Gujarat Secondary Education Board)	30

Teaching-Learning Methodology	Lecture-cum discussion method, Demonstration method, group-work, workshop approach, conducting small scale experiments, experiential learning, pair work, Preparing teaching-learning aids, Analytical approach, Problem solving etc.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	30%
2.	University Examination	70%





Course Outcomes: Having completed this course, the learner will be able to

1.	Design lesson plans using various approaches and methods of teaching science.
2.	Appraise activities of science club and science exhibitions.
3.	Review National Focus Group position paper (2005) on science teaching.
4.	Apply various print and ICT resources in science teaching.
5.	Develop lifelong learning attributes through teaching-learning of science.
6.	Determine role of science teacher.
7.	Explore into activities of ATAL tinkering lab.
8.	Conduct formative assessment using various techniques in practice teaching.
9.	Construct activities of Science exhibitions and science club.

Suggested References:

Sr. No.	References
1.	Textbook for B.Ed. Pedagogy of Science: Physical Science Part I & Part II. National Council of Educational Research and Training, 2013.
2.	Aikenhead, W. W. (1998). Cultural aspects of learning science. <i>Part one</i> , pp 39-52. (B. F. Tobin, Ed.) Netherlands: Kluwer academic Publisher.
3.	Barba, H.R. (1997). <i>Science in Multi-Cultural Classroom: A guide to Teaching and Learning</i> . USA: Allyn and Bacon.
4.	Bevilacqua F, Giannetto E, & Mathews M.R., (eds.). Science Education and Culture: The Contribution of History and Philosophy of Science. The Netherlands: Kluwer Academic Publishers.
5.	Cobern, W. W. (1998). <i>Socio-Cultural Perspectives on Science Education</i> . London: kluwer Academic Publisher.
6.	Deo, M.G. & Pawar, P.V. (2011), General Article: Nurturing Science Talent in Villages, In <i>Current Science</i> , Vol. 101, No. 12, pp1538-1543.
7.	Hines, S. M. (Ed.). (2005). Multicultural science Education: Theory, Practice, and Promise (Vol. 120). New York, U.S.A: Peter Lang.
8.	Lee, E. & Luft, J. (2008). Experienced Secondary Science Teachers' Representation of Pedagogical Content Knowledge. <i>International Journal of Science Education</i> 30(10), 1343-1363(21), August





9.	Lee, O. (2003). Equity for Linguistically and Culturally Diverse Students in Science Education. <i>Teachers College Record</i> , 105 (3), pp 465-489.
10.	Lynch, S. J. (2000). <i>Equity and Science Education Reform</i> . Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
11.	<i>National Curriculum Framework for Teacher Education: Towards Preparing Professional and Humane Teacher (2009-10)</i> , NCERT: New Delhi
12.	Newsome, J. G. & Lederman, N. G. (Eds.) (1999). <i>Examining Pedagogical Content Knowledge: The Construct and its Implications for Science Education</i> . Kluwer Academic Publishers, The Netherlands
13.	Parkinson, J. (2002). Chapter-1. Learning to Become an Effective Science Teacher. In <i>Reflective Teaching of Science 11-18: Continuum Studies in Reflective Practice and Theory</i> . New York: Continuum. pp. 1-12.
14.	Quigley, C. (2009). Globalization and Science Education: The Implications for Indigenous knowledge systems. <i>International Educational Studies</i> , 2 (1), pp 76-88.
15.	Rivet, A.E. & Krajick, J.S. (2008). Contextualizing Instruction: Leveraging Students' Prior Knowledge and Experiences to Foster Understanding of Middle School Science, In <i>Journal of Research in Science Teaching</i> , Vol. 45, No. 1, pp 79-100.
16.	Sears, J. and Sorensen, P. (Eds.). (2000). <i>Issues in Science Teaching</i> . Routledge Falmer, The Netherlands.
17.	Tobin, K. (Ed.). (1993). <i>The Practice of Constructivism Science Education</i> . Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.
18.	Van Driel, J.H.V., Beijaard, D. & Verloop, N. (2001). Professional Development and Reform in Science Education: The Role of Teachers' Practical Knowledge. <i>Journal of Research in Science Teaching</i> , 38(2), 137-158, February
19.	Wallace J. and Loudon W. (eds.). <i>Dilemmas of Science Teaching: Perspectives on Problems of Practice</i> . London: Routledge Falmer. pp. 191-204.
20.	Wang, H. A and Schmidt, W. H. (2001). - History, Philosophy and Sociology of Science in Science Education: Results from the Third International Mathematics and Science Study. In F. Bevilacqua, E. Giannetto, and M.R. Mathews, (eds.). <i>Science Education and Culture: The Contribution of History and Philosophy of Science</i> . The Netherlands: Kluwer Academic Publishers. pp.83-102.
21.	જોશી, એચ., લીખીયા, કે., શાહ, બી., શાહ, એચ., ભરૂયા, એન. (2004). <i>વિજ્ઞાન અધ્યાપનનું પરિશીલન</i> (ત્રીજી આવૃત્તિ). અમદાવાદ : બી.એસ. શાહ પ્રકાશન.
22.	પટેલ, વી. જી. (1993). <i>વિજ્ઞાન શિક્ષણનો નૂતન અભિગમ</i> (પ્રથમ આવૃત્તિ). સુરત : સાહિત્ય સંકુલ.
23.	પાંડે, શશિકિરણ. <i>વિજ્ઞાન શિક્ષણ</i> . નई દિલ્લી : વાણી પ્રકાશન દરીયાગંજ.
24.	રાવત, ડી.એસ. (1971). <i>વિજ્ઞાન શિક્ષણ</i> (6 <sup>th</sup> Ed.) આગરા : વિનોદ પુસ્તક મંદિર.





On-line resources to be used if available as reference material

On-line Resources

[https://ncert.nic.in/desm/pdf/phy\\_sci\\_partI.pdf](https://ncert.nic.in/desm/pdf/phy_sci_partI.pdf)

[https://ncert.nic.in/desm/pdf/phy\\_sci\\_PartII.pdf](https://ncert.nic.in/desm/pdf/phy_sci_PartII.pdf)

<https://www.edsys.in/innovative-science-teaching-methods/>

<https://www.arvindguptatoys.com/>

<http://www.bdu.ac.in/cde/docs/ebooks/B-Ed/I/TEACHING%20OF%20SCIENCE.pdf>

<https://www.pdfdrive.com/pedagogy-and-practice-teaching-and-learning-d17464309.html>

[https://tinker.ly/atal-tinkering-lab/?gclid=CjwKCAiA9vOABhBfEiwATCi7GGEf1TFBJX-CrPWfoqLuUL6qaPE7OqvQwZuZ-MX4QyS4kXOW9EyFhoC59QQA\\_vD\\_BwE](https://tinker.ly/atal-tinkering-lab/?gclid=CjwKCAiA9vOABhBfEiwATCi7GGEf1TFBJX-CrPWfoqLuUL6qaPE7OqvQwZuZ-MX4QyS4kXOW9EyFhoC59QQA_vD_BwE)

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