



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

Course Code	UE01GBED59	Title of the Course	CPS-3 : 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 derive the characteristics of Science from definitions.</li><li>2. The student-teachers relate Science with day-today life.</li><li>3. The student-teachers explain science as a process.</li><li>4. The student-teachers appreciate scientific discoveries.</li><li>5. The student-teachers elaborate the Importance of Science for society.</li><li>6. The student-teachers appraise the role of eminent scientists in development of science.</li><li>7. The student-teachers illustrate Science process skills in practice teaching.</li><li>8. The student-teachers construct specific objectives for developing their lesson plans.</li><li>9. The student-teachers design lesson plans applying the taught theories.</li><li>10. The student-teachers create learning material and teaching-learning aids for their classroom Teaching.</li></ol>
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Course Content		
Unit	Description	Weightage* (%)
1.	<b>Understanding Science as a Discipline</b> A. Science : Concept and Science as a Method/Process <ol style="list-style-type: none"><li>1. Science : Concept, Nature, Interdisciplinary nature of science.</li><li>2. Science as a method (Observation, Inquiry, Hypothesis, Experimentation, Data collection, Generalization</li></ol> B. Science and Society <ol style="list-style-type: none"><li>1. Impact of science on Society.</li><li>2. Science for environment, health, peace and equity</li></ol> C. Science Process Skills	35





	<ol style="list-style-type: none"><li>1. Illustrations and Implications of science process skills</li><li>2. Observing, Interring, Measuring, communicating, classifying, predicting</li></ol> <p>D. Self Learning</p> <ol style="list-style-type: none"><li>1. Contribution of eminent Scientists : Isaac Newton, John Dalton, J.C. Bose, Albert Einstein, Neils Bohr, C.V. Raman, De Broglie, Bimla Buti, V. Ramakrishan, Dr. Vikram Sarabhai, Dr. Homi Bhabha</li><li>2. History of science</li></ol>	
2.	<b>Exploring Learning Objectives and Instructional Planning</b> <p>A. Objectives of teaching science</p> <ol style="list-style-type: none"><li>1. General objectives of teaching science in school education</li><li>2. Formation of specific objectives and learning outcomes in context of Bloom's Taxonomy</li></ol> <p>B. Lesson Planning</p> <ol style="list-style-type: none"><li>1. Instructional planning : Structure and framework</li><li>2. Dimensions of planning concept Mapping, content Analysis, questioning, activity based and learner centred planning.</li></ol> <p>C. Maxims of teaching</p> <ol style="list-style-type: none"><li>1. Maxims of teaching : Known to Unknown, Concrete to Abstract, General to Specific, Part to Whole</li><li>2. Improvised Apparatus , Teaching learning Aids : Concept, Construction and Importance</li></ol> <p>D. Self learning Learning Resources</p> <ol style="list-style-type: none"><li>1. General science laboratory : organization and Importance</li><li>2. Community Science Centre : Introduction and Activities (Visit)</li></ol>	35
3.	Textbook of Class 8 (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.	Apply science process skills in their classroom teaching.
2.	Connect Science as a method in scientific inquiries.
3.	Assemble questioning, activities and teaching-learning material for teaching science.
4.	Analyse content of textbook in relation to objectives of teaching.
5.	Formulate activities using maxims of teaching.
6.	Evaluate classroom teaching following lesson plans.
7.	Construct improvised apparatus for teaching science.
8.	Organize science laboratory.

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.	<i>National Curriculum Framework, (2005)</i> , NCERT: New Delhi
13.	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
14.	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.
15.	Quigley, C. (2009). Globalization and Science Education: The Implications for Indigenous knowledge systems. <i>International Educational Studies</i> , 2 (1), pp 76-88.
16.	<i>Rashtriya Madhyamik Shiksha Abhiyan (2005)</i> . MHRD: New Delhi
17.	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.
18.	Sears, J. and Sorensen, P. (Eds.). (2000). <i>Issues in Science Teaching</i> . Routledge Falmer, The Netherlands.
19.	Tobin, K. (Ed.). (1993). <i>The Practice of Constructivism Science Education</i> . Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.
20.	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
21.	Wallace J. and Louden W. (eds.). <i>Dilemmas of Science Teaching: Perspectives on Problems of Practice</i> . London: Routledge Falmer. pp. 191-204.
22.	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.





23.	જોશી, એચ., લીખીયા, કે., શાહ, બી., શાહ, એચ., ભરૂયા, એન. (2004). <i>વિજ્ઞાન અધ્યાપનનું પરિશીલન</i> (ત્રીજી આવૃત્તિ). અમદાવાદ : બી.એસ. શાહ પ્રકાશન.
24.	પટેલ, વી. જી. (1993). <i>વિજ્ઞાન શિક્ષણનો નૂતન અભિગમ</i> (પ્રથમ આવૃત્તિ). સુરત : સાહિત્ય સંકુલ.
25.	પાંડે, શશિકિરણ. <i>વિજ્ઞાન શિક્ષણ</i> . નई દિલ્લી : વાણી પ્રકાશન દરીયાગંજ.
26.	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
<a href="https://ncert.nic.in/desm/pdf/phy_sci_partI.pdf">https://ncert.nic.in/desm/pdf/phy_sci_partI.pdf</a>
<a href="https://ncert.nic.in/desm/pdf/phy_sci_PartII.pdf">https://ncert.nic.in/desm/pdf/phy_sci_PartII.pdf</a>
<a href="https://www.edsys.in/innovative-science-teaching-methods/">https://www.edsys.in/innovative-science-teaching-methods/</a>
<a href="https://www.arvindguptatoys.com/">https://www.arvindguptatoys.com/</a> <a href="https://www.learningclassesonline.com/2020/10/pedagogy-of-science.html">https://www.learningclassesonline.com/2020/10/pedagogy-of-science.html</a>
<a href="http://www.bdu.ac.in/cde/docs/ebooks/B-Ed/I/TEACHING%20OF%20SCIENCE.pdf">http://www.bdu.ac.in/cde/docs/ebooks/B-Ed/I/TEACHING%20OF%20SCIENCE.pdf</a>
<a href="https://www.pdfdrive.com/pedagogy-and-practice-teaching-and-learning-d17464309.html">https://www.pdfdrive.com/pedagogy-and-practice-teaching-and-learning-d17464309.html</a>
<a href="https://onlinecourses.swayam2.ac.in/nou20_ed04/preview">https://onlinecourses.swayam2.ac.in/nou20_ed04/preview</a>
<a href="https://itpd.ncert.gov.in/mss/course_content/Module%2011%20-%20Padagogy%20of%20Science.pdf">https://itpd.ncert.gov.in/mss/course_content/Module%2011%20-%20Padagogy%20of%20Science.pdf</a>
<a href="https://www.learningclassesonline.com/2020/10/pedagogy-of-science.html">https://www.learningclassesonline.com/2020/10/pedagogy-of-science.html</a>
<a href="http://egyankosh.ac.in/bitstream/123456789/46666/1/BES-141B1E.pdf">http://egyankosh.ac.in/bitstream/123456789/46666/1/BES-141B1E.pdf</a>
<a href="https://ddceutkal.ac.in/Syllabus/MA_Education/Education_Paper_5_SCIENCE.pdf">https://ddceutkal.ac.in/Syllabus/MA_Education/Education_Paper_5_SCIENCE.pdf</a>
<a href="http://www.hbcse.tifr.res.in/">http://www.hbcse.tifr.res.in/</a>

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