

**HOMI BHABHA CENTRE FOR SCIENCE EDUCATION**  
**Tata Institute of Fundamental Research**

Date: July 04, 2024

**Course Name:** Understanding Teaching Practices (Part 1)

**Course Code:** SCE103.2

**Credits:** Four

**Period:** From August 13, 2024

**Number of weeks:** 13-14

**Hours per week:** 4 hrs

**Contact hours:** 52 hrs, 26 sessions.

**Instructors Name:** Dr Narendra D. Deshmukh and Dr Kalpana Kharade.

**Time and location:** Tuesday and Fridays, 11.00 am to 1.00 pm, Blended mode (Online & Room 217, Main building. Webinar link- <https://webinar.hbcse.tifr.res.in/b/dr--mb4-kgz>

\*Field work locations will be intimated later.

## **I. About the Course**

This "Understanding teaching practicum" course is designed for doctoral students seeking to develop advanced pedagogical knowledge for getting insight in to different perspectives about pedagogical theories, educational practices and action research in school as well as higher education settings. Through a combination of readings, hands-on activities, and reflective exercises, scholars will engage with the readings of latest research in teaching and learning, design diverse assessments of student learning, explore active learning techniques, and design and implement action research projects to enhance their understanding about teaching practice.

## **II. Learning Outcomes:**

After completion of the course the scholars will be able to:

- 1) Demonstrate a deep understanding of current literature on educational practices including active learning pedagogies and assessments and effectively apply it to their professional practices.
- 2) Develop assessment framework for inclusive and socially just classrooms environment.
- 3) Design teaching/ learning strategies based on active learning for attainment of higher order learning outcomes of the learners.

- 4) Design a rigorous action research project focused on enhancing students' learning in Science/ Mathematic disciplines.

### **III. Course Units:**

#### Unit 1: Reading and analysing literature on progressive pedagogical practices

- Overview of current trends and research in progressive educational pedagogies
- Critical analysis of seminal articles and key theoretical frameworks
- Application of evidence-based practices to teaching scenarios

#### Unit 2: Assessing Student Learning

- Understanding concept of assessment (Assessment of/ for and as a learning).
- Constructing valid and reliable assessment tools, including rubrics and exams
- Providing formative and summative feedback to enhance student learning
- Designing inclusive assessment practices
- Using digital technology for assessment

#### Unit 3: Understanding Active Learning

- Exploration of various active learning strategies and their applications
- Understanding pedagogies for creating inclusive and engaging learning environments
- Integrating technology to support active learning

#### Unit 4: Designing Action Research Project

- Identifying research questions related to teaching and learning
- Selecting appropriate methodologies and data collection techniques
- Analyzing and interpreting data to inform teaching practice

### **IV. Assessment:**

1. Weekly Reflections and Discussion Participation (20%)
2. Literature Review Analysis (20%)
3. Assessment Design Project (20%)
4. Active Learning Activity Design (20%)
5. Action Research Proposal (20%)

## V. Course Format:

The course will be delivered through a combination of lectures, group discussions, hands-on activities, peer feedback sessions, and individual consultations with the instructor. Students will have the opportunity to apply the concepts and techniques learned in their own teaching contexts and receive constructive feedback from peers and the instructor.

## VI. List of readings/reference:

1. Tippett, T.P., & Lee, J.J. (2019). Looking Back to Move Forward: Understanding Progressive Education in the 21st Century. *Journal of Applied Learning in Higher Education*.
2. Little, T. (2013). 21st Century Learning and Progressive Education: An Intersection. *International Journal Of Progressive Education* , 9 (1) , 84-96 . Retrieved from <https://dergipark.org.tr/en/pub/ijpe/issue/26313/277317>
3. Lamon S, Knowles O, Hendy A, Story I and Currey J (2020) Active Learning to Improve Student Learning Experiences in an Online Postgraduate Course. *Front. Educ.* 5:598560. doi: 10.3389/educ.2020.598560
4. Ribeiro-Silva E, Amorim C, Aparicio-Herguedas JL and Batista P (2022) Trends of Active Learning in Higher Education and Students' Well-Being: A Literature Review. *Front. Psychol.* 13:844236. doi: 10.3389/fpsyg.2022.844236
5. Herodotou C, Sharples M, Gaved M, Kukulska-Hulme A, Rienties B, Scanlon E and Whitelock D (2019) Innovative Pedagogies of the Future: An Evidence-Based Selection. *Front. Educ.* 4:113. doi: 10.3389/educ.2019.00113.
6. Kloss, Dean, "Peachtown 2019: Practice And Pedagogy In A Progressive Learning Setting" (2021). Dissertations - ALL. 1316. <https://surface.syr.edu/etd/1316>
7. Raghavan, N. (2016). *The reflective teacher: Case studies of action research*. Chennai, India: Orient Black Swan.
8. Raghavan, N., Sood, V., & Anilkumar, K. (2018). *Teaching tales, learning trails*. Chennai, India: Notion Press. Link- <https://badal.hbcse.tifr.res.in/index.php/s/mJC58pjFFkBzBQf#pdfviewe>.
9. Cohen, L, Manion, L., & Morrison, K. (2007). *Research methods in education* (6th e.) Routledge. (Chapter 14 Action Research, pp297-312).
10. Prince, M (2004). Does Active Learning Work? A Review of the Research. [https://scholar.google.co.in/scholar\\_url?url=https://www.academia.edu/download/36102258/Prince\\_AL.pdf&hl=en&sa=X&ei=fGdLZZW0BaKO6rQPpOuFyA8&scisig=AFWwa eYHzmjvtuGmMETWiMu04Iy &oi=scholar](https://scholar.google.co.in/scholar_url?url=https://www.academia.edu/download/36102258/Prince_AL.pdf&hl=en&sa=X&ei=fGdLZZW0BaKO6rQPpOuFyA8&scisig=AFWwa eYHzmjvtuGmMETWiMu04Iy &oi=scholar)
11. Demosthenous, E., Christou, C., & Pitta-Pantazi, D. (2021). Mathematics Classroom Assessment: A Framework for Designing Assessment Tasks and Interpreting Students' Responses. *European journal of investigation in health, psychology and education*, 11(3), 1088–1106. <https://doi.org/10.3390/ejihpe11030081>
12. Hestenes, D., & Halloun, I. (1995). Interpreting the FCI. *The Physics Teacher*, 33, 502–506.
13. Klymkowsky, M.W., Garvin-Doxas, K. (2020). Concept Inventories: Design, Application, Uses, Limitations, and Next Steps. In: Mintzes, J., Walter, E. (eds)

Active Learning in College Science. Springer, Cham. [https://doi.org/10.1007/978-3-030-33600-4\\_48](https://doi.org/10.1007/978-3-030-33600-4_48)

14. Miles, J. (2022). The 3 Different Types of Assessment in Education. <https://www.hmhco.com/blog/different-types-of-assessment-in-education>
15. Mutlua, A. and Sesenb, B.A. (2015). Development of a two-tier diagnostic test to assess undergraduates' understanding of some chemistry concepts. *Procedia - Social and Behavioural Sciences* 174, 629 – 635.
16. Treagust, D. F. (1988). Development and use of diagnostic tests to evaluate students' misconceptions in science. *International Journal of Science Education*, 10, 159–169.

### **Additional Reading Resources**

Assessment in Mathematics

<https://www.learnalberta.ca/content/mewa/html/assessment/index.html>

Using Classroom Assessment Techniques

<https://www.cmu.edu/teaching/assessment/assesslearning/CATs.html>

Understanding the Role of Assessment in Learning

[https://www.queensu.ca/teachingandlearning/modules/assessments/04\\_s1\\_01\\_intro\\_section.html](https://www.queensu.ca/teachingandlearning/modules/assessments/04_s1_01_intro_section.html)

Assessment Tools and Instruments

<https://serc.carleton.edu/NAGTWorkshops/assess/tools.html>

Science assessment tools

<https://assessment.tki.org.nz/Assessment-tools-resources/Commonly-used-assessments/Science-assessment-tools>

List of Concept Inventories-

<https://cgi.tu-harburg.de/~zllwww/fachdidaktik/ci/?lang=en>

CERI-OEDC. (2008). Assessment for Learning Formative Assessment, Available at: <http://www.oecd.org/site/educeri21st/40600533.pdf>.

<https://teaching.washington.edu/engaging-students/active-learning/#:~:text=Active%20learning%20is%20an%20instructional,to%20what%20they%20already%20know.>

<https://www.bu.edu/ctl/guides/active-learning/>

<https://www.prodigygame.com/main-en/blog/types-of-assessment/>

<https://cft.vanderbilt.edu/student-assessment-in-teaching-and-learning/>

<https://www.niu.edu/citl/resources/guides/instructional-guide/formative-and-summative-assessment.shtml>