

**SBC (1) (I.6.3) Hands-on Mathematics Learning
Skill Based Course**

1. Credit Distribution of the Course

Course title & Code SBC (1) (I.6.3)	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Hands-on Mathematics Learning	2	1	0	1	Undergraduate	-

2. Learning Objectives

This course emphasizes the importance of experiential and interactive learning methods that engage students in active problem-solving and conceptual understanding. It presents an overview of hands-on learning approaches in mathematics learning and how to create creative and engaging hands-on math learning resources.

3. Learning Outcomes

- explain the principles of ‘hands-on’ and ‘mind-on’ approaches to mathematics learning;
- explore the role of manipulatives and tangible tools/models in strengthening mathematical learning;
- design and field test puzzles, games, and storyboards using low cost local resources;
- use popular resources as Geoboards, Dienes’ blocks, and Escher’s tiles to support mathematical concepts.

4. Syllabus

Unit I Key Principles of Hands-on learning - Hands-on & Mind-on approach in mathematics; Importance of Manipulatives & Visual Models; Mathematics through Play, Puzzles, Games & Storytelling. **[7 hours]**

Unit II Interactive Hands-on Mathematics learning resources - Characteristics of learner centric resources; Using Manipulatives in math classroom: (popular manipulatives Geoboards, Dienes’ blocks, Escher’s tiles etc); Locally drawn and low cost manipulatives. **[8 hours]**

5. Practicum: School Pre-Immersion Program **[30 hours]**

- Designing and field testing mathematical board games and field test;
- Designing and field testing a story board

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- Mathematical puzzles
- Organizing math fair in school
- Develop interactive hands-on mathematics learning tool and use it as a learning-teaching resource in a math classroom. (as part of the School Pre- Immersion Program).

6. Essential Readings

- Carey B. (2015). *How We Learn*, Random House Inc.
- Gardner M. (2003). *Mathematics, Magic and Mystery*, Dover Publications Inc.
- Marzano R.J. (2017). *Classroom Management That Works: Research-Based Strategies for Every Teacher*. ASCD.

7. Suggestive Readings

- Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2018). *Elementary and middle school mathematics: Teaching developmentally* (10th ed.). Pearson.
- Boaler, J. (2016). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages, and innovative teaching*. Jossey-Bass.