Course Title: Bhāvanā Adhyayana: Conceptual Mathematic in Mother Tongues

Course Instructor: Mr. Posina Venkata Rayudu

Credit Hours: 2

Course Description: Bhāvanā Adhyayana: Conceptual Mathematic in Mother Tongues is a study of concepts in general and abstraction of mathematical concepts from commonplace categorical perception in particular. Mathematics is mistakenly equated with numbers and calculations; the present course is a long-overdue corrective scientific outreach intended to bring into figural salience for all to see the significance of ideas and their geometric objectification in constructing a connected conceptual architecture that is mathematic. Recognition of the primacy of concepts is facilitated throughout the course by way of encouraging students to create words in their mother tongues that fit mathematical concepts presented in English language.

Learning Objectives: This course is not about calculating correct answers quickly! The main objectives of Bhāvanā Adhyayana are (i) to introduce students to a cohesive body of concepts that's adequate for abstracting mathematical essence(s) of any subject matter, including anthropology, cognitive science, consciousness studies, design science, education, history, linguistics, neuroscience, philosophy, and psychology, in addition to computer science, engineering, and physics that are reflexively associated with mathematics and (ii) to prepare students to think about mathematics in their mother tongues, with the attendant comprehension

being indispensable for making original contributions to the advancement of science (as opposed to servicing western imperialism).

Pre-requisites for registration/auditing: No formal training in mathematics or concepts (beyond that of high school) is required. Advanced mathematical concepts and constructions will be introduced in a manner comprehensible to all. However, those of us championing anglo-american colonialism may find this course unpalatable.

Expected Student Workload:

Attending weekly 2-hour lectures is mandatory. Weekly reading assignments include selected publications on philosophy of mathematics, history of mathematics education, educational reforms (cf. National Education Policy 2020), and conceptual mathematics (CM) *vis-à-vis* artificial intelligence (AI). Writing assignments include verbal descriptions of mathematical (equational and diagrammatic) calculations in English language and in students' mother tongues. In-class presentation of a conceptual mathematics exercise of individual student's choice and evaluation of fellow students' presentations constitute the midterm examination. Students are required to submit a final term paper bringing conceptual mathematics to bear on their chosen universe of discourse; alternatively, students can submit a translation of a substantive part of conceptual mathematics (e.g., politics of the pedagogy of mathematics, crooked timber of mathematics) into their mother tongues.

Course Duration: August - November 2025

Lecture Topics and Discussion

Week 1: *lauter Einsen* and A Bag of Contradictions

Week 2: Categorical Perception and Category Theory

Week 3: Place-Value notation to CATEGORY

Week 4: Category of Sets; *Verbindung* (putting together those that fit together)

Week 5: Two Ways of Knowing: Geometry and Algebra

Week 6: A Trinity to Triangulate Reality: Unity, Change, and Reflection

Week 7: Gestalt GRLBDING *vs.* Categorical SUM (**1 + 1 = 2**, but why?)

Week 8: Newton's BODY *vs.* Lawvere's OBJECT (Leibniz, Poincaré, and African UBUNTU)

Week 9: Midterm Presentations and Evaluations (in-class)

Week 10: Dharma (Sanskrit *dhr-*) *vis-à-vis* Natural

Week 11: Concepts are basic; truth is derived.

Week 12: Objective Number Theory and Broad Objective Logic

Week 13: Can AI abstract the Architecture of Mathematics?

Week 14: On writing well (abstract of final term paper / translation topic; in-class writing exercise)

Week 15: Nirākārā-AND-Nirguṇa: The *Saint Graal* of Mathematics

Week 16: Math beyond Stage-0 and The 2nd Half of Science (compounding epistemology and ontology into which reality is resolved)

Notes of weekly 2-hour lectures will be emailed a week in advance so that students can get to know what's in store for them in the upcoming lecture. Final term paper is due within two weeks after the last in-class lecture (Week 16). Lastly, the linear run run of prose may be inadequate for presenting certain subject matters in which case poetic expressions are welcome.

Basis for Final Grades

Class participation (questioning and asking clarifications): 10%

Verbal description of a mathematical calculation / construction: 10%

Midterm presentation of a CM exercise and evaluation of peer presentations: 30% (10 + 20)

In-class writing exercise (abstract): 10%

Final term paper / mother tongue translation: 40%

Books and References

Acharya Kamalaśīla / Parmananda Sharma (1997) Bhāvanākrama, Aditya Prakashan.

Charles Ehresmann (1966) Trends toward unity in mathematics, **Cahiers de topologie et géométrie différentielle** 8(1): 1 - 7.

Cynthia Sundberg Wall (2006) The Prose of Things, The University of Chicago Press.

Elaine Scarry (1994) Resisting Representation, Oxford University Press.

F. William Lawvere and Stephen H. Schanuel (2009) Conceptual Mathematics: A First Introduction to Categories, 2nd edition, Cambridge University Press.

F. William Lawvere and Robert Rosebrugh (2003) Sets for Mathematics, Cambridge University Press.

Posina Venkata Rayudu (2020) Brain is a property type, **Science** (eLetter).

Posina Venkata Rayudu (2022) Gandhi's *Satya*: Truth entails peace, in **Gandhi in the Twenty First Century**, Anshuman Behera and Shailesh Nayak (eds.), Springer Nature, pp. 189 - 198.

Posina Venkata Rayudu (2024) Mathematics for debatable conclusions, **Nature** (Online Comment).

Posina Venkata Rayudu, Dhanjoo N. Ghista, and Sisir Roy (2017) Functorial semantics for the advancement of the science of cognition, **Mind & Matter** 15(2): 161 - 184.

Posina Venkata Rayudu and Sisir Roy (2022) Objective logic of consciousness, in **Perception and Cognition**, Buddhadev Bhattacharya and Sisir Roy (eds.), Nava Nalanda Mahavihara, pp. 97 - 130.

Sisir Roy and Posina Venkata Rayudu (2024) Category theory and the ontology of śūnyatā, in **The Origin and Significance of Zero**, Peter Gobets and Robert Lawrence Kuhn (eds.), Brill, pp. 450 - 478.