

**IIT Mandi**  
**Proposal for a New Course**

**Course number** : IK\_506  
**Course Name** : Research methods and statistics for contemplative science  
**Credit Distribution** : (2-1-0-3) (*Lectures-Tutorial-Practical-Total credits*)  
**Intended for** : 3<sup>rd</sup> & 4<sup>th</sup> Year B. Tech, Masters and PhD  
**Prerequisite** : None  
**Mutual Exclusion**: None

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**1. Preamble:**

Research methods and statistics are the foundation for scientific research. Two existing courses of the institute (HS550 & HS 522) covers research methods and statistics from social science perspective. Considering the inherent challenges associated with contemplative science research (e.g., Yoga/Meditation), this course is designed to equip the students to develop skills in research methods and statistics from a contemplative science perspective. This course would enable the students/research scholars working on Indian knowledge systems and mental health applications (IKSMHA) to understand the concepts better from a contemplative science and mental health perspective.

**2. Course Modules with quantitative lecture hours (42 hours):**

**Module 1 (21 hours + 7 tutorial hours)**

**Research methods theory:**

Basic assumptions underlying scientific research

Ethics in scientific research

Literature review and hypothesis formulation

Data collection methods

Measurement techniques & Sampling methods

Research designs

Apart from controlled trial designs (including randomized controlled trial designs-RCT), emphasis will also be given on case-control study design and prospective cohort design from contemplative science perspective. For example, studying the effect of advanced meditation (with monks is more feasible from case-control design

than RCT). Similarly naturalistic cohort long term follow-up studies are optimal from sampling perspective to study the effect of yogic/meditative lifestyle.

Procedure for conducting research experiment

Control techniques in experimental research

Mixed methods research

Emphasis on first person (for subjective experience) and third person perspective-based assessments will be discussed. Special emphasis on experience sampling method and its relevance for contemplative science will be discussed

Scientific writing

### **Tutorial sessions**

Randomization procedure

Scientific illustrations-Inkscape and blender

Reference management-Zotero

Qualitative data coding-Qualcoder

**Note:** All the tutorial sessions will be taught with Yog/Meditation based dataset for better understanding of the concepts

### **Module 2 (7 hours + 7 tutorial hours)**

#### **Statistics theory**

Data representation-tables & figures

Descriptive statistics

Key ingredients for inferential statistics

Hypothesis testing, statistical significance and decision errors

T tests

ANOVA

Correlation

Regression

Chi square test

Linear mixed model analysis (LMM)

Distribution free statistics

#### **Tutorial sessions (Using Jamovi & R-open-source free software)**

Data wrangling

T tests

ANOVA

Correlation & Regression

Chi square test

LMM

Sample size calculation-G power

**Note:** All the tutorial sessions will be taught with Yog/Meditation based dataset for better understanding of the concepts

### 3. Text books:

Christensen LB, Johnson B, Turner LA. Research Methods, Design, and Analysis. Pearson Education; 2019.

Aron A, Aron EN. Statistics for psychology (6<sup>th</sup> Ed). Pearson Education; 2013.

### 4. References:

Zar JH. Biostatistical analysis. Pearson Education India; 1999.

Creswell JW, Poth CN. Qualitative inquiry and research design: Choosing among five approaches. Sage publications; 2016

### Similarity with the existing courses:

(Similarity content is declared as per the number of lecture hours on similar topics)

S. No.		Course Code	Similarity Content	Approx. % of Content
1.		HS550	Hypothesis testing, T test, ANOVA, correlation & regression	25%
2		HS 522	Literature review & Hypothesis formulation	5 %

### 6. Justification of new course proposal if cumulative similarity content is >30%:

**Responses for the reviewer's comments:**

**Reviewer 1:**

Dr Arun Sasidharan MBBS, PhD (Neurophysiology)  
Scientist-C  
Centre for Consciousness Studies  
Dept of Neurophysiology  
National Institute of Mental Health & Neurosciences (NIMHANS)  
Bengaluru

**Comment 1:**

*As there are overlapping courses from social science perspective, it would be good to have a subtopic (in Module 1 & 2) that describes the differences between social science and contemplative science perspectives in terms of application/challenges in research method and statistics approaches.*

**Response 1:**

*Suggestions are incorporated on page no-1 & 2, under research designs and mixed methods section in module 1*

**Comment 2:**

*Explicitly mention that the Lab sessions would use examples/datasets from contemplative science research*

**Response 2:**

*Suggestions are incorporated on page no- 2, under tutorial sessions in module 1 & 2*

**Reviewer 2:**

Dr Bhupendra Singh MBBS, MD (Psychiatry)  
Additional Professor  
Dept of Psychiatry (Geriatric Mental Health)  
King George Medical College  
Lucknow

**Comments:**

*The course content looks good.*