

# Research Regulations of IOST, TU



- Ph.D. Program** : **Regulations** (2017)  
: **Thesis Format** (2017)  
: **Curriculum** (2017)  
: **Scholarship** (2021)
- Post Doc Program** : **Regulations** (2020)
- IRC : Standard Operating Procedure** (2020)

Tribhuvan University  
**Institute of Science and  
Technology**  
Dean's Office, Kirtipur, Kathmandu  
February 2021



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**Tribhuvan University**  
**Institute of Science and Technology**  
**Dean's Office, Kirtipur**

**Regulations of Ph.D. Program**  
**Revised as per the guideline of UGC-Nepal-2074**

The doctoral (Ph.D.) program of Tribhuvan University Institute of Science and Technology (IOST) is intended for those who wish to develop career in teaching, research and advanced knowledge in the field of Science and Technology. The Ph.D. students are expected to achieve a high standard of academic excellence and contribute to scientific theory and/or experiment through original research.

The Ph. D. program of IOST is regulated by the Research Committee (RC-IOST) constituted under the chair of the Dean in accordance to *Tribhuvan University Organization and Academic Administration Rule 2050, chapter 3, section 9*. The research committee frames its necessary working rules in compliance with the existing regulation. The Ph. D program is conducted according to the following rules and regulations.

**1. Entry Requirement**

- 1.1 A candidate must pass entrance exam conducted by IOST, TU.
- 1.2 A candidate requires at least second division or 3.0/4.0 CGPA in the Master Level (M.Sc. in respective discipline or M.A. in Mathematics & Statistics from T.U. or from any University recognized by T.U..
- 1.3 Candidate passed with second division or 3/4.0 CGPA must have 2 years work experience.
- 1.4 Candidate passed with 1st division or 3.3/4.0 CGPA must have 1 year work experience.
- 1.5 Candidate passed with distinction or 3.7/4.0 CGPA need not require to work experience.

- 1.6 For interdisciplinary: candidate must complete 30 CH (Credit Hour) conversion course. Candidate who takes 30 CH course after joining the department he/she will be eligible to be awarded Ph.D. Degree from that department.
- 1.7 Priority will be given to those candidate who has at least one paper in peer reviewed Journal. This will be applicable while registering in the department.

## 2. Mandatory Course Work

- 2.1 Ph.D. students should complete 18 credit hour courses within first two semesters of the enrollment. The course details are as follows:

Duration of course work:	2 semesters
Total Marks:	450
Duration of examination:	2 hrs for each paper

### First Semester

Course Title:

Research methodology (General): 3 CH

Philosophy: 3 CH

Seminar: 3 CH

**Note:** *The syllabus for first two courses will be designed and conducted by IOST, TU, for all Ph.D. students. Seminar will be arranged at the concerned department and campuses.*

### Second Semester

Course Title

Research methodology (Adv.): 3 CH

*(software, programming, theory, fieldwork, lab-work etc.)*

Specific course: 3 CH

*(as per the demand of Ph.D. work)*

Seminar: 3 CH

**Note:** *The syllabus for these courses will be designed and conducted by concerned departments of TU.*

- 2.2 Examination will be held at the end of each semester. Total lecture hour will be 135 (=15 x 9) per semester. (1 CH is equivalent to 15 hrs)
- 2.3 A committee will be formed by IOST, TU in order to address/manage remuneration to the faculties, entrance exam fee, examination fee etc.
- 2.4 Admission procedures and entrance examination will be as per the rule of T.U.
- 2.5 For part time Ph.D. students, two semesters (during course work) should be regular as per rule and calendar of concerned department.

### **3. Ph.D. Supervisor Qualification**

- 3.1 Ph.D. supervisor should be a permanent faculty member of TU with a Ph. D. Degree.
- 3.2 Supervisor should be working as professor or reader in the concerned department/campus of TU.
- 3.3 Supervisor should have at least 5 publications in the international or index Journal of respective subject.
- 3.4 Lecturer can also supervise the Ph.D. students provided he/she has at least 8 papers in international or index journal of respective subjects.
- 3.5 A University teacher can supervise fixed number of Ph.D. students at a time as follows:

Professor	5
Reader	4
Lecturer	2

#### **4. Ph.D. Co-supervisor Qualification**

- 4.1 Ph.D. co-supervisor should be Ph. D. degree holder and faculty member in the concerned department of IOST/other relevant institutions (government sectors, hospitals, industry, research centre, etc.).
- 4.2 Co-supervisor should have at least 2 papers in relevant subject in international or index Journal.
- 4.3 A University faculty can co-supervise fix number of Ph.D. students, as follows:

Professor	5
Reader	4
Lecturer	3

#### **5. Requirement for conducting Ph.D. Program:**

- 5.1 Institution/Department must have been conducting Master/M.Phil program at least for 5 years.
- 5.2 Institution/Department must have permanent faculties viz. Professor - 2, Reader or Lecturer - 6.

#### **6 Candidate should obtain plagiarism clearance certificate before the submission of Ph.D. Thesis.**

**7 Schedule for Ph.D. Enrollment (tentative):** IOST will offer annual intake and it will be announced by notice..

#### **8 Role of CDRC (Central Department Research Committee)**

- 8.1 The Central Department Research Committee shall undertake the academic and internal evaluation and review responsibility of Ph. D. Program.
- 8.2 The Head of Central Department shall form five members Central Department Research Committee (CDRC) including one subject expert from outside.

- 8.3 The Central Department shall manage meeting allowance for the CDRC meetings and try to generate resources for research.
- 8.4 The CDRC shall certify that most of the research work offered by the candidate is one, which can be pursued in the Department or Campus.

## **9 Enrollment and Registration**

- 9.1 A candidate interested to enroll into Ph.D. program shall apply to the concerned Central Department, where he/she intends to work in a subject related to his/her research.
- 9.2 The application form (on approved format) and processing charge for enrollment in Ph.D. program shall be available from the concerned Central Department of IOST on payment of the amount as decided by the Dean's Office.
- 9.3 The candidate must include a research proposal and CV of candidate as well as of the Supervisor and Co-supervisor(s) including a list of publications, recommendation of the supervisor, no objection letter from employer, assurance letter of study leave from the employer only for full time research candidate.
- 9.4 Central Department Research Committee (CDRC) shall evaluate the research proposal and application. The candidate shall have to defend the proposal in the Central Department to justify that he/she possesses adequate knowledge in the field of study proposed for the Ph.D. research. The CDRC shall also certify that the subject offered by the candidate is one which can be pursued either within the department, or any other concerned department or a research centre of Tribhuvan University or any other research institute recognized by the research committee. A letter of permission/consent of the Head of Department/ Laboratory/Institute/Research centre shall be attached along with the application.



- 9.5 After incorporation of suggestions (if any), the CDRC shall recommend the application to the Research Committee of IOST, for registration into the Ph. D. course.
- 9.6 IOST will organize meeting of the Research Committee to approve the recommendation of CDRC. The Dean's Office will inform the CD Head, the concerned institute, the candidate and supervisor about the decision on application. In case of approval, the candidate should get registered in the IOST after passing entrance examination.
- 9.7 Dean's office shall provide the candidate a provisional registration for one year. The candidate has to prove his/her research ability within one year. After receiving recommendation from the CDRC, the Research Committee of IOST will consider the candidate as a Ph.D. student.
- 9.8 The title of Ph. D. thesis shall be provisional at the time of registration. It shall be finalized six months before submission of the thesis, and approved by the Research Committee after recommendation from CDRC.
- 9.9 The candidate pursuing interdisciplinary research shall fulfill requirement as suggested by the CDRC (see condition for interdisciplinary research).
- 9.10 If approved by the research committee, the candidate shall register into IOST by payment of registration and other fees decided by the Research Committee of IOST. The fees would be charged till the thesis is finally submitted to the department.
- 9.11 A Ph.D. student must attend the course/seminar organized by the concerned Department (CDRC).
- 9.12 After enrollment for Ph. D., the student shall not undertake any responsibility except research without approval of CDRC, at the recommendation of the supervisor.
- 9.13 A Ph. D. student shall not enroll for any other degree during the Ph.D. research period.

9.14 A Ph. D. candidate's registration would be cancelled if he/she violates any regulations and progress is unsatisfactory.

9.15 Research Centre for Applied Science and Technology (RECAST) can conduct Ph. D. Program under the research guidelines of IOST. The RECAST should forward Ph. D. applications and thesis to IOST and IOST may take opinion from concern CDRC. However this clause is not applicable according to guide line of UGC-2073 (see above guideline 5).

## **10. Condition for Interdisciplinary Research**

**10.1** IOST-TU, promotes interdisciplinary research. The candidate willing to enroll for Ph.D. in subject different from his/her M.Sc. must complete pre-requisites such as course work/ bridge course or fulfill the required background by teaching experience and publications.

## **11. Supervision of Research Work**

11.1 A candidate must pursue research work at the Central Department or any other pertinent Department, Campus or research centre of Tribhuvan University for a duration of three years from the date of enrollment. However, with the recommendation of the supervisor and permission from Department, part of the work can be carried out in the research centre or laboratory/institute recognized by the CDRC.

11.2 In case of MOU with research organizations, the Ph. D. work can be conducted at that organization.

11.3 Ph. D. Research shall be monitored regularly by the CDRC and Campus/ Research Committee (Science and Technology) CRC(ST). A Progress report by the Ph. D. student should be submitted in every six months to the Dean's office through the CDRC. The Ph.D. student shall present a seminar about his/her research work in the Central Department at least once a year as decided by the CDRC.

- 11.4 Responsibility of the supervisor shall be to guide the candidate in research, keep the log book of Ph. D. student, send the annual confidential report of the candidate, check the thesis and recommend for examination to CDRC if satisfied. The CDRC may seek advice or any other cooperation from supervisor and co-supervisor.
- 11.5 The supervisor and the concerned department/campus/ research centre shall keep records of the progress and attendance of the candidate and forward a brief report on approved format about the progress of the candidate's work conducted by him/her as well as carried out outside the central department or some other institute. The candidate shall request the Head where he/she is working to send the attendance and progress report to the CDRC for approval.
- 11.6 Once the supervisor accepts the candidate for Ph. D, it is his/her responsibility to guide the candidate, and if the Ph. D. student is not regular, then he/she should inform to CDRC in time.
- 11.7 If a candidate requests the CDRC to change his/her supervisor showing a genuine reason, the CDRC can entertain the application and recommend it if justified to the research committee. In case of such situation with co-supervisor, supervisor shall report CDRC accordingly with justification.
- 11.8 In case of a difference arising between a candidate and his/her supervisor and other matters viz. transfer of supervisor, health problem, etc the CDRC shall report the matter to the Research Committee with recommendation for decision.
- 11.9 A faculty member who is going to retire after a one year from Tribhuvan University shall not enroll a Ph. D. student under his/her supervision. However, he/she can continue supervision for already registered student, and can undertake Ph.D. student as co-supervisor. However on special case Research Committee, Dean Office will take decision.

## 12. Time Requirement for Ph.D.

12.1(a) *Full time researcher*: The Ph. D. thesis of full time researcher shall be submitted only after the completion of three years of registration. However, for an exceptional work, evident from standard publications, the CDRC may recommend submission of thesis after 2 years of registration. If the candidate cannot submit the thesis within five year of registration it will be considered automatically cancelled. (b) *Part time researchers*: The PhD thesis of part time researcher shall be submitted after completion of five years from the date of registration. The thesis must be submitted within seven years of registration, and if not submitted, it will be considered automatically cancelled. This rule will also be enforced to the part time researchers who were enrolled before amendment of regulations of Ph.D. program, 2071.

As provision of IOST a full time researcher is considered as a researcher who will give his/her full time in research work with taking leave from their job otherwise that candidate will be considered as a part time researcher.

12.2 *Re-Registration*: If a candidate fails to submit thesis as per rule 12.1, but has worked substantially, then he/she can request for re-registration on same topic and under same supervisor. He/she can get re-registered by submitting fresh application to the Central Department within a month of expiry of registration. In such case the candidate can submit thesis within two years, but not before six months of re-registration (full time researcher) whereas for part time researcher it will be within three years from the date of re-registration. If candidate fails to submit thesis within two years of re-registration for full time and three years for part time researcher then his/her re-registration will be automatically cancelled. The fee shall be double than their normal registration period for both the cases.

12.3 Before submission of the thesis, the candidate has to present research work in a pre-submission seminar organized by the CDRC. The CDRC must send the report of this presentation with recommendation to the research committee of IOST.

### **13. Attendance**

All the Ph.D. students must show at least 80% attendance in the register kept at the Department or Campus. The supervisor must forward the attendance to CDRC through Campus Chief/ Department Head.

### **14. Thesis Format and Official Requirements**

14.1 On completion of the research work the candidate must submit a soft copy and four copies of neatly computer-printed spiral bound thesis and its summary in a format approved by the Research Committee along with the recommendation of CDRC, which shall be forwarded to the Dean, IOST with necessary recommendations.

14.2 A candidate shall submit a declaration in writing in thesis through the supervisor to the effect that:

- (a) He/she has not submitted the thesis to any other institute, and
- (b) The thesis submitted by the candidate is the work of his/her own and is not on the basis for which the Ph. D. degree has been already awarded by any other University/Institute.

14.3 The thesis submitted for examination shall satisfy the following requirements:

- (a) The thesis must render some substantial contribution to knowledge and show evidence of originality through the discovery of new facts and findings or the exercise of independence and critical power in interpretation of facts and theories, or the new interpretation of facts and theories.

- (b) It must also be satisfactory in terms of its language and presentation.
- (c) The thesis must be written in English.
- (d) The hard bound copies must be submitted to Dean's office after viva-voce.

14.4 At least two original research papers of the Ph. D. research work must be published in an indexed journal including one in international journal. Also, at least once, participation and presentation of research related papers in National / international seminars symposia / conferences is required.

## **15 Evaluation of Thesis**

15.1 The research committee shall ask the supervisor to submit a minimum of seven names of experts in the related subject as a panel of thesis examiners, out of which at least three examiners must be from overseas, and four from SAARC countries including at least one from Nepal.

15.2 The thesis shall be sent to three examiners, at least one from overseas and two from SAARC, appointed by the Research Committee. The examiners may recommend on the format that the thesis be accepted for the award of Ph.D. degree or that the thesis be rejected or that the thesis be allowed to be resubmitted with improvements as suggested by the examiners.

15.3 If there is a difference of opinions among the examiners in regard to the acceptance of the thesis, the following arrangements shall be made for the final decision.

- (a) The thesis will be rejected, if two out of three examiners reject the thesis.
- (b) If one examiner rejects the thesis, it will be referred to a new examiner, for final decision, however, if the rejected.
- (c) In case any one of the examiner suggests that the thesis be allowed to be resubmitted with improvements or revision, the candidate will be asked to make the necessary improvements and revisions according to the suggestions made by the examiner(s).
- (d) The thesis must be resubmitted if so recommended by the examiner assigned by Research Committee.

- (e) A revised thesis must be resubmitted by the candidate within six months from the date of information on the decision of the research committee to him/her. The revised thesis shall reach to the IOST accompanied by the full amount of examination fee within two weeks of the time allowed for the submission of thesis.
- 15.4 If the thesis is accepted, the candidate shall have to take an open oral examination (viva-voce), which will be conducted by the external examiner appointed by the Research Committee in the presence of the Dean, Research Committee, CDRC of the concerned department, supervisor(s) and other interested persons. In case the examiner appointed to conduct the oral examination (viva-voce) is not available, the Research Committee may appoint another examiner to conduct the oral examination (viva-voce) on given time.
- 15.5 The report of the examiners on the thesis as well as the examiner conducting oral examination (viva-voce) shall be finally considered by the Research Committee, and forward it for the Ph.D. degree to concerned authority.
- 15.6 In case of successful defense by the candidate the Dean shall notify the result in accordance with the decision of the research committee and publish the result and communicate it to the news media.
- 15.7 The Dean shall forward the result of the Ph.D. degree to the concerned authority for conferring the degree.

## **16. Ethical Issues**

The Ph. D. researcher should maintain all the ethical issues pertinent to research. They are required to get permission of the concerned department or council or community or individual as per the nature of the research. The Ph. D. researcher will conduct all the research activities complying with the existing laws, and rules/regulations of the country. TU-IOST will not be responsible for any consequences in failing to do so by the candidate.

# General Guidelines for Ph.D. Thesis Format



**Tribhuvan University  
Institute of Science and Technology (IOST)  
Kirtipur, Nepal**

**2014**



## **17. General Guidelines: Format of the Thesis**

In order to maintain the uniformity of the Ph.D. thesis carried out in different departments under Institute of Science and Technology (IOST), Tribhuvan University, Nepal, the following guidelines are prepared.

### **17.1 Front Matter**

The front matter should be strictly maintained, which are as follows:

- i. Cover Page
- ii. Blank Page
- iii. Inner Cover Page
- iv. Declaration
- v. Recommendation
- vi. Letter of Approval
- vii. Acknowledgements
- viii. Abstract
- ix. Table of Contents
- x. List of Acronyms and Abbreviations
- xi. List of Symbols (if any)
- xii. List of Tables
- xiii. List of Figures

The details of these items with examples are given below.

**Note:** In the examples, font (which should be Times New Roman), font size, normal/boldface, caps, etc are given in the italic as comments or in bracket.

(Format for cover page)

**[TITLE OF THE Ph.D. THESIS]**

*Comment [s1]: All caps, Bold, Font size: 18*

**[Logo of T.U.]**

**A THESIS SUBMITTED TO THE**

*Comment [s2]: All caps, not bold, font size: 14*

**CENTRAL DEPARTMENT OF .....**

**INSTITUTE OF SCIENCE AND TECHNOLOGY**

**TRIBHUVAN UNIVERSITY**

**NEPAL**

*Comment [s3]: All caps, Boldface, Font size: 14*

**FOR THE AWARD OF**

**DOCTOR OF PHILOSOPHY**

**IN .....**

*Comment [s4]: (All caps, Boldface, Font size: 14)*

**BY**

*Comment [s5]: All caps, not bold, Font size: 14*

**[FULL NAME OF THE RESEARCH SCHOLAR]**

**[MONTH YEAR]**

*Comment [s6]: All caps, Bold, Font size: 14*

**(Example of Cover page)**

# INVESTIGATION ON INORGANIC SALTS BASED ION SELECTIVE ELECTRODES



A THESIS SUBMITTED TO THE  
CENTRAL DEPARTMENT OF CHEMISTRY  
INSTITUTE OF SCIENCE AND  
TECHNOLOGY  
TRIBHUVAN UNIVERSITY  
NEPAL

FOR THE AWARD OF  
DOCTOR OF PHILOSOPHY  
IN CHEMISTRY

BY  
NAME OF THE CANDIDATE  
JULY 2011

**BLANK PAGE**

(Format for inner cover page)

**[TITLE OF THE Ph.D. THESIS]**

[Logo of T.U.]

A THESIS SUBMITTED TO THE  
CENTRAL DEPARTMENT OF .....  
INSTITUTE OF SCIENCE AND TECHNOLOGY  
TRIBHUVAN UNIVERSITY  
NEPAL

FOR THE AWARD OF  
DOCTOR OF PHILOSOPHY  
IN .....

BY  
[FULL NAME OF THE STUDENT]  
[MONTH YEAR]

(Example of inner cover page)

# INVESTIGATION ON INORGANIC SALTS BASED ION SELECTIVE ELECTRODES



A THESIS SUBMITTED TO THE  
CENTRAL DEPARTMENT OF CHEMISTRY  
INSTITUTE OF SCIENCE AND TECHNOLOGY  
TRIBHUVAN UNIVERSITY  
NEPAL

FOR THE AWARD OF  
DOCTOR OF PHILOSOPHY  
IN CHEMISTRY

BY  
NAME OF THE CANDIDATE  
JULY 2011

## DECLARATION

*Comment [s7]: All caps, Bold, Font size: 16*

Thesis entitled “.....(**in boldface letter**) .....” which is being submitted to the Central Department of....., Institute of Science and Technology (IOST), Tribhuvan University, Nepal for the award of the degree of Doctor of Philosophy (Ph.D.), is a research work carried out by me under the supervision of Prof. Dr.....,..... of Central Department of....., Tribhuvan University and co-supervised by Prof. Dr..... of .....

This research is original and has not been submitted earlier in part or full in this or any other form to any university or institute, here or elsewhere, for the award of any degree.

*Comment [s8]: Times New Roman, Font size:12*

**[signature]**

[Name of research scholar]

*Comment [s9]: Times New Roman, not bold, Font size:12*

## RECOMMENDATION

*Comment [s10]: All caps, Bold, Font size: 16*

This is to recommend that (**official name of research scholar in boldface letter**) .....has carried out research entitled“.....  
(**in boldface letter**) .....” for the award of  
Doctor of Philosophy (Ph.D.) in .....  
(**subject in boldface letter**) ..... under my/our  
supervision. To my /our knowledge, this work has not been submitted for  
any other degree.

He/She has fulfilled all the requirements laid down by the Institute of  
Science and Technology (IOST), Tribhuvan University, Kirtipur for the  
submission of the thesis for the award of Ph.D. degree.

*Comment [s11]: Times New Roman, Font size: 12*

.....

**Name of Supervisor**

**Supervisor**

(**Designation.....**)

*Comment [s12]: Times New Roman, Bold, Font size: 12*

Central Department of .....

Tribhuvan University

Kirtipur, Kathmandu, Nepal

*Comment [s13]: Times New Roman, no bold, Font size: 12*

.....

**Name of Co-Supervisor (if any)**

**Co-Supervisor**

(**Designation .....**)

*Comment [s12]: Times New Roman, Bold, Font size: 12*

Central Department of .....

Tribhuvan University

Kirtipur, Kathmandu, Nepal

*Comment [s15]: Times New Roman, no bold, Font size: 12*

**[Month Year]**

*Comment [s16]: Times New Roman, Bold, Font size: 12*



(This content should be in Letter Head of Concerned Department)

## LETTER OF APPROVAL

*Comment [s17]: All caps, Bold, Font size: 16*

[Date: Day/Month/Year]

**Comment [s18]:** Times New Roman, Font size: 12

On the recommendation of Prof. Dr. (**official name of supervisor/co-supervisor** (if any) ....., this Ph.D. thesis submitted by (**official name of research scholar**) ....., entitled “..... (**in boldface letter**) .....” is forwarded by Central Department Research Committee (CDRC) to the Dean, IOST, T.U..

.....  
**Name of Head of Department**

*Comment [s19]: Bold, Times New Roman, Font size: 12*

Professor

Head

Central Department of .....

Tribhuvan University

Kirtipur, Kathmandu

Nepal

*Comment [s20]: Times New Roman, Font size: 12*

## **ACKNOWLEDGEMENTS**

*(Font size – 16, Boldface, all caps)*

Text : 12 points font size

Page size: Not more than 2 pages in justified form

.....  
(Name of Research Scholar)  
Month Year

*Comment [s21]: Times New Roman, Font size: 12, normal*

## **ABSTRACT**

*(Font size – 16, Boldface, all caps)*

Text: 12 points font size

Page size: Preferably one page but not more than 2 pages in justified form

## **LIST OF ACRONYMS AND ABBREVIATIONS**

*(Font size – 16, Boldface, all caps)*

**Example:**

*(Text : 12 points font size)*

DC : Direct Current

DTA : Differential Thermal Analysis

## **LIST OF SYMBOLS**

*(Font size – 16, Boldface, all caps)*

**Example:**

*(Text: 12 points font size)*

- $\gamma$  : Activity Coefficient
- $\epsilon$  : Relative Dielectric Constant
- $\epsilon_0$  : Dielectric Permittivity

## **LIST OF TABLES**

*(Font size – 16, Boldface, all caps)*

**Example:**

*(Text : 12 points font size)*

**Page No.**

**Table 1: (caption in boldface)**

1

**Table 2: (caption in boldface)**

2

*(not in boldface)*

## LIST OF FIGURES

*(Font size – 16, boldface letter, all caps)*

**Example:**

*(Text : 12 points font size)*

**Page No.**

**Figure 1: (figure caption in boldface)**

1

**Figure 2: (figure caption in boldface)**

2

*(not in boldface)*

# TABLE OF CONTENTS

(Font size – 16, Bold faced letter, all caps)

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List of Acronyms and Abbreviations	vii
List of Symbols (if any)	viii
List of Tables	ix
List of Figures	x

(Text: 12 font size, normal)

## **CHAPTER 1** (boldface, all caps, 14 font size)

1. **INTRODUCTION** (boldface, all caps, 12 font size)
  - 1
  - 1.1 Introduction (normal, 12 font size) 2
  - 1.2 Rational
  - 1.3 Objectives

## **CHAPTER 2** (boldface, all caps, 14 font size)

2. **LITERATURE REVIEW** (boldface, all caps, 12 font size)
  - 2.1 (Sub headings, if any) (normal, 12 font size)
  - 2.2....., etc.

## **CHAPTER 3** (boldface, all caps, 14 font size)

3. **MATERIALS AND METHODS** (boldface, all caps, 12 font size)
  - 3.1 (Sub headings, if any) (normal, 12 font size)
  - 3.2....., etc.

## **CHAPTER 4** (boldface, all caps, 14 font size)



**4. RESULTS AND DISCUSSION** (*boldface, all caps, 12 font size*)

4.1 (Sub headings, if any) (*normal, 12 font size*)

4.2....., etc.

**CHAPTER 5** (*boldface, all caps, 14 font size*)

**5. CONCLUSION AND RECOMMENDATIONS**(*boldface, 12 font size*)

**CHAPTER 6** (*boldface, all caps, 14 font size*)

**6. SUMMARY** (*boldface, 12 font size*)

**7. REFERENCE**

**APPENDIX:** Scientific Publication, questionnaires, long computational algorithms (if necessary)

**Note:** *Ph.D. thesis for some of the departments such as Statistics and Mathematics may not fit into the above mentioned patterns (Introduction, Review of Literature, Materials and Methods, Results and Discussion, Conclusion, Summary and Recommendation for Further Work). For such situations, the body part of the thesis should be of having the following order:*

1. Introduction
2. Chapters with the specific heading covering the research work done by the Ph.D. research scholar
3. Summary and conclusions (*This includes the overall summary, conclusions and the recommendation for further work if applicable*).

Hence the Ph.D. research scholars of IOST may follow either one of these two formats whichever suits based on the nature of the work. This alternative format is given below.

**Alternative Format of Ph.D. Thesis**

**TABLE OF CONTENTS**

*(Font size – 16, Bold faced letter, all caps)*

	<b>Page No.</b>
Declaration	ii
Recommendation	iii
Certificate of Approval	iv
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Abstract	vi
List of Acronyms and Abbreviations	vii
List of Symbols (if any)	viii
List of Tables	ix
List of Figures	x

*(Text: 12 points font size)*

**CHAPTER 1***(boldface, all caps, 14 font size)* .....

1

**INTRODUCTION** *(boldface, all caps, 12 font size)*

1.1 Introduction *(not bold, 12 font size)*

1.2 Rational

1.3 Objectives

**CHAPTER 2***(Bold face, all caps, 14 font size)*.....

Chapter 2 (Chapters with specific heading based on research work)

**CHAPTER 3***(Bold face, all caps, 14 font size)*.....

Chapter 3 (Chapters with specific heading based on research work)

**CHAPTER 4***(Bold face, all caps, 14 font size)*.....

Chapter 4 (Chapters with specific heading based on research work)

**CHAPTER 5** (*Bold face, all caps, 14 font size*).....

5. **SUMMARY AND CONCLUSIONS**

5.1 Summary

5.2 Conclusions

5.3 Recommendations for Further work

**REFERENCES**

**APPENDIX:** Scientific Publication, questionnaires, long computational algorithms (if necessary)

## 17.2 Shape, Margin, Size and Outlook of PhD Thesis

### Length

- (a) Preferably in between 100 to 300 pages including all pages of the thesis

### Printing

- (a) High contrast laser printing (single sided printing only)
- (b) Good quality of white bond paper of A4 size (210 mm × 297mm)
- (c) Photocopy is not acceptable.

### Typeface and font size

- (a) Must be written in **Times New Roman**.
- (b) The font size should be 12 points throughout the text including page numbers except other things mentioned in some preliminary pages.
- (c) The font size for headings should be 12 (boldface) and for subheadings 12 (boldface).
- (d) The scientific names should be in italics.
- (e) Equations and formulae should be preferably typed in 10 or 12 point font size.

### Tables and Figures

- (a) Should appear in the text closely following the point where it is first discussed.
- (b) The table number and heading should be placed above the body of the table.
- (c) The figure number and the caption should be in general placed below the figure except some constraints for the software generated figures.
- (d) The text font size in the table and figure should be 10 and font is Times New Roman.

Example: **Figure 1 (Bold):**..... (Title: Not bold).....

**Table 1 (Bold):** ..... (Title: Not bold).....

Figure and table numbering must be continuous throughout the thesis.

## Margins

- Top, right hand, and bottom margins: 1 inch
- Left hand margin: At least 1.5 inches so that binding should be accommodated
- Page numbers must be at least 0.5 inch from the lower edge of each page.
- The text should be justified.

## Spacing

- Spacing throughout body of text: 1.5 spacing.
- Spacing for references: 1.5 spacing *within* each entry but double spacing *between* each entry.
- Spacing for table of contents, list of tables, list of figures or illustrations, and lengthy tables: 1.5 or even single spacing may be used.

## Binding

- Good quality of hard binding (in black color and printed with golden ink) is required.
- The following information must be printed on the spine of the binding:
  - ✓ Title (the student should provide a shortened version if necessary)
  - ✓ Author's last name
  - ✓ Year of submission of the thesis
  - ✓ There should be printed Spine and Corner Bumps in the hard cover of the thesis. In the Corner Bumps 'PHD / TITLE / NAME / YEAR should be printed (all caps / font size as per required)

## Pagination

- Every page in the thesis has a number.
- For the preliminary pages (such as *declaration, certificate of approval, table of Contents, list of tables, list of figures, list of tables, list of symbols, etc.*) use small Roman numerals (i, ii, iii, iv, v...). These may be placed at the bottom of the page. Count the inner cover page as page i and the other pages such as declaration, certificate of approval, dedication page (if

any) ii, iii, iv, etc, *but do not print the page number on inner cover page. Print the page numbers from “Declaration”.*

- (c) For the text, use Arabic Hindu numbers (1, 2, 3, 4, 5...) starting with page one (the first page of the text itself i.e. Chapter 1).

### **Subunits in the Contents**

- (a) Subunits of the contents should be as follows:

- 1.1
- 1.1.1
- 1.1.1.1
- 1.1.1.1.1
- 1.1.1.1.1.a

Page numbers can be at the centre bottom and should be at least half an inch from any edge of the paper to avoid loss when the thesis is trimmed. Since page numbers are used to demonstrate that the thesis is complete, every page must be consecutively numbered, including the pages containing tables, graphs, illustrations, and references.

### **Photographs**

- (a) The clear with high resolution (at least 300 pixel/inch) photographs should be used wherever necessary.
- (b) Colour photos with RGB (at least 500 pixel/inch in glossy paper) are recommended.

### **Use of colour**

- (a) All colour plots, graphs, topography, etc should be printed in colour in all copies.
- (b) Colour graphics can be used when appropriate. However, all copies of the thesis must be identical.

### **Language**

- (a) Must be written in English language
- (b) Presentation of thesis in Viva-Voce examination should be conducted in English medium.

### 17.3 Reference and Citation in the Text

The references should be arranged in alphabetical with chronological order by surname of the first author. American Psychological Association (APA) format should be preferably followed for references and citations in the text. Spacing for references should be of 1.5 spacing *within* each entry but double spacing *between* each entry. Also use hanging indents: entries should begin flush left with subsequent lines indented. However, any other standard format such as AMS (American Mathematical Society), AIP (American Institute of Physics), ACS (American Chemical Society), etc. can also be accepted in their respective subjects but the format must be uniform throughout the thesis.

Typical style of writing the references and citations in APA format are given below.

#### **BOOKS:**

##### **One Author**

Surname, initials, (year), Title of the book, Place, Publication

Gore, A. (2013). *An inconvenient truth: The Planetary emergency of global warming and what we can do about it*. Emmaus, PA: Rodale.

**Citation in the text:** (Gore, 2013) or Gore (2013) explained.....

##### **Two Authors**

Michaels, P.J., & Balling, R.C. (2000). *The satanic gases: Clearing the air about global warming*. Washington, DC: Cato Institute.

**Citation in the text:** (Michaels & Balling, 2000) or Michaels and Balling (2000) stated that.....

##### **Multiple Authors**

Sthapit, A., Yadav, R., & Khanal, S. (2013). *Fundamentals of Statistics*. Ashmita Publications, Kathmandu.

**Citations in the text:** (Sthapit, *et al.*, 2013) explained .....

## JOURNAL ARTICLES:

### Single Author

Khanal, S. P. (2011). Achievements, Challenges and Opportunities of Statistics for the Twenty First Century. *Management Dynamics*, 15(1):15-21.

**Citations in the text:** (Khanal, 2011) or Khanal (2011) highlighted.....

### Multiple Author

Thapa, S.S., Khanal, S.P., Paudel, I., Gurung, R., Ruit, S., & Van Rens, H.M.B.(2012). A Population based Survey of the Prevalence and Types of Glaucoma in Nepal: The Bhaktapur Glaucoma Study. *Ophthalmology*, 119(4): 759-764.

**Citations in the text:** (Thapa *et al.*, 2012) or Thapa *et al.* (2012) found that.....

*The names of the Journals should be typed exactly as the name of the Journal such Stat. Med. J. Am. Stat. Assoc., J. Chem. Phys., Nat. Commun., etc.*

## PH.D. /MASTER'S THESIS

Rajbhandari (Nyachhyon), A. (2011). *Investigation on Inorganic Salts based Ion Selective Electrodes* (Unpublished doctoral dissertation). Central Department of Chemistry, Institute of Science and Technology, Tribhuvan University, Kathmandu, Nepal.

## CONFERENCE PROCEEDINGS

Smith, J.M. (1990). Proceedings of the *Topical Meeting on CP Symmetry*, 20-24 Sept. 1989, ed.: W. Bhattacharya, PHI. doi:10.18454/IRJ.2015.0001



**INTERNET ARTICLE BASED ON A POINT SOURCE (EXACT DUPLICATE) WITH DOI ASSIGNED**

Stultz, J. (2006). Integrating exposure therapy and analytic therapy in trauma treatment. *American Journal of Orthopsychiatry*, 76(4):482-488. doi:10.1037/0002-9432.76.4.482

**INTERNET ARTICLE (E-JOURNAL / OPEN ACCESS) WITH NO DOI ASSIGNED (ONLY LINK)**

Sillick, T. J., & Schutte, N. S. (2006). Emotional intelligence and self-esteem mediate between perceived early parental love and adult happiness. *E-Journal of Applied Psychology*, 2(2): 38-48.

Retrieved

from

<http://ojs.lib.swin.edu.au/index.php/ejap/article/view/71/1>

00 Accessed on (21/04/2014)

## 18. PhD Scholarship Program 2020: Guideline

### 18.1 Background

The doctoral (PhD) program of Tribhuvan University Institute of Science and Technology (IOST) is intended for those who wish to develop career in teaching, research and advanced knowledge in the field of Science and Technology. The Ph.D. students are expected to achieve a high standard of academic excellence and contribute to scientific theory and/or experiment through original research. In order to attract and encourage young researchers to pursue PhD under IOST in one of its Central Departments PhD Scholarship Program has been launched. The aim of the Scholarship Program is to promote qualified scholars to focus their time in research thereby generating good research outputs. The Program is expected to encourage young students into research which in long run will be crucial in improving the overall quality of education.

This guideline is prepared to provide all the information needed regarding the procedure for the selection of candidates for the award of the PhD Scholarship. It will guide the aspirants to prepare proposal for the Scholarship and also provide a basis for evaluation in a transparent manner. The scholarship program should be managed by Research Committee of IOST, T.U.

### 18.2 Evaluation Committee

- i. IOST will form an Evaluation Committee for the evaluation of the applications and monitoring of the PhD Scholarship Program.
- ii. Formation of the Evaluation Committee
 

Coordinator:	Assistant Dean (Research), IOST
<i>Members:</i>	
Representative from the IOST Research Committee (IRC) - 1	
Expert	- 1
Administrative Officer	- 1
Account Officer	- 1
<i>Invited Members:</i>	
1. Subject Experts	- 2

- iii. Meeting allowance for the Evaluation Committee members will be provided by IOST as per TU Rules and Regulations.
- iv. Evaluation Committee will invite Experts from relevant subject for evaluating proposals. The supervisor / co-supervisors of the candidate are prohibited to be a member for the evaluation of their own PhD student/s. Remuneration for experts will be decided by IOST.
- v. The final list of selected candidates will be recommended to IRC for final approval.

### **18.3 Eligibility:**

- i. Must be a Nepali citizen
- ii. Age limit: not over 32 years (at the time of announcement of the scholarship)
- iii. Must have passed Master's degree in relevant subject with minimum GPA of 3.3 (or minimum 70% in aggregate)
- iv. Must be a current PhD applicant (appearing in the ongoing admission to the PhD program of IOST)
- v. Must be enrolling as a full time PhD student

### **18.4 Evaluation scheme**

All the proposals will be evaluated to a maximum score of 100 on the basis of the following criteria, whose detail is given in Table 1:

- i. Master's degree score (10%)
- ii. Entrance score (10%)
- iii. Publications (20%)
- iv. Proposal evaluation (40%)
- v. Oral presentation (Proposal defense) (20%)

**Table 1:** Evaluation of the application for the PhD Scholarship

S.N.	Indicator	Weightage
1	<p><b>Master's degree score</b>            Required minimum GPA of 3.3 (or minimum 70% in aggregate)            Score = GPA x 10/4 (or, Score = secured percentage x 10/100)  <i>Note: No additional score will be provided for any other degree.</i></p>	10
2	<p><b>Entrance score</b>            Score = secured number x 10/50            (or, Score = secured percentage x 10/100)</p>	10
3	<p><b>Publications</b>            Scoring guideline:            Published in SCImago Journal Ranking Q1 = 10            Published in SCImago Journal Ranking Q2 = 8            Published in SCImago Journal Ranking Q3 = 6            Published in SCImago Journal Ranking Q4 = 4            Published in peer-reviewed journal with minimum of one star of JPPS as in NepJOL = 2            Published in any other peer-reviewed Journal* = 1  <i>*ISSN or e-ISSN needed / as per TUSC criteria</i>  <b>Note:</b> <i>In case of multi-authored article, the first author and the corresponding author get the full mark, and all other authors get half of the full mark. No any scores are provided for non-peer reviewed articles.</i></p>	20
4	<p><b>Proposal evaluation</b>            Scores and basis for evaluation:  <b>Title = 2</b>            (The title must be concise, complete and reflect exactly the proposed study project)  <b>Introduction / research background = 4</b>            (The proposal must clearly introduce the research problem being investigated, objectives, justification, novelty, limitations, and scope of the study)  <b>Literature review = 8</b>            (The proposal must clearly cite on which earlier findings it is be based. Literature review must be relevant, inclusive and well updated justified by reliable standard references in the field of study.)</p>	40

	<p><b>Research methodology = 15</b>  (The proposal must clearly explain the research methodology and how it may lead to innovative ideas in the relevant field. Why this methodology is appropriate? What are its limitations and delimitations? Provide justifications of the research techniques, methods, procedures, etc.)</p> <p><b>Expected findings = 5</b>  (The proposal must clearly state the expected key findings, and that must be consistent with the title, objectives, and methodology. Also the expected contribution in the field of study must be provided.)</p> <p><b>References, language and writing style = 6</b>  (References must be reliable (from verified Journals), all cited in the text and in the list of references, written according to the prescribed format. At least one-third of the Journal listed in the reference should be of last 10 years. The overall writing must follow standard scientific norm.)</p>	
5	<p><b>Oral presentation (Proposal defense)</b></p> <p><b>Quality of the presentation</b> [5]  (presentation quality/organization of the slides, fluency, body language, time management)</p> <p><b>Q/A session</b> [5]  (Response to the Questions, clarity,</p> <p><b>Competence of the candidate</b> [5]  (Depth of the knowledge of the subject, understanding of the importance of research, skills in methodology, analysis, and technical, enthusiasm)</p> <p><b>Quality of the research proposal</b> [5]  Research title is specific and clear, objectives are academically interesting, adequate, and achievable, methodology is well presented and is appropriate for the study, Gantt chart is well described, expected results are clear, significant, and has the potential for scientific Journal publication)</p> <p><b>Note:</b> <i>IRC representative will evaluate Quality of the presentation, Expert will observe and evaluate Q/A session, and the last two is for the subject expert.</i></p>	20

## 18.5 Scholarship Scheme

- i. The total amount of the scholarship will be notified during the announcement. It will be a lump sum calculated on the basis of 3 years PhD program, and disseminated in 6 installments. However, the selected candidate must pay all the fees as per the rule of IOST and concerned Department. Monthly fee will be reimbursed to the students each year after upon the submission of receipts.
- ii. Release of the Scholarship amount:
  - (a) 1<sup>st</sup> installment will be released immediately after the successful candidates have formally enrolled as a full time PhD student within the time-frame given for admission
  - (b) 2<sup>nd</sup> to 4<sup>th</sup> installments will be released after the successful completion of all required course works (if applicable) and submission of the progress report to IOST (through the CDRC)
  - (c) 5<sup>th</sup> and 6<sup>th</sup> installments will be released only if the candidate completes the PhD work within 5 years.
  - (d) 5<sup>th</sup> installment will be released after the PhD work is submitted to IOST (through the CDRC) for the process of final viva-voce examination
  - (e) The final (6<sup>th</sup>) installment will be released after successful completion of the final viva-voce examination (this includes positive comments from all three external examiners, publications, etc. which are mandatory for the award of the degree)
  - (f) Research committee, IOST, TU will decide the specific discipline to award the scholarship.
- iii. The Dean, IOST, TU is the authority to resolve any issue or dispute that may arise during the Scholarship Program in accordance with the TU Rules and Regulations.

24 November 2020, Kirtipur

## 19. Regulations of Postdoctoral Research Program 2017

The post doctoral program of Tribhuvan University, Institute of Science and Technology (IOST) is intended for those who wish to develop career in teaching, research and advanced knowledge in the field of Science and Technology. The postdoctoral fellows are expected to achieve a high standard of academic excellence and contribute to scientific theory and/or experiment through original research. The aim of the program is mainly to strengthen the research program of IOST.

The post doctoral programme of IOST is regulated by the Research Committee (RC-IOST) constituted under the chair of the Dean in accordance with **Tribhuvan University Organization and Academic Administration Rule 2050, Chapter 3, Section 9**. The Research Committee frames its necessary working rule in compliance with the existing regulation. The post doctoral research programme is conducted according to the following rules and regulations.

### 18.6 Registration

To be registered as a post doc fellow candidate must have following qualifications:

- 18.6.1** The candidate must have Ph.D. from Tribhuvan University (TU) or any other university recognized by Tribhuvan University.
- 18.6.2** On the date of registration as a post doc fellow at TU, the date of award of Ph.D. degree to the candidate should not be more than 4 years.
- 18.6.3** The candidate must have published at least 5 publications including at least three in international journals (the journals must be science indexed).
- 18.6.4** The candidate should not be working with any other institute/company during his post doc research work.
- 18.6.5** The candidate has to contact advisor whose expertise should be in the research area related to previous work

of the candidate. There could be maximum two advisors even though the collaboration could be carried out with as many people as the researchers want. At least one advisor must be from TU.

**18.6.6** If any permanent faculty of IOST wants to pursue post doc research the candidate may be allowed to pursue post doc research at IOST in study leave as per the rule to TU.

**18.6.7** To be registered as a post doc fellow at TU, the candidate has to apply to CDRC through his/her advisor with a strong research proposal. The CDRC has to forward the research proposal after presentation at CDRC to IOST Research Committee.

## **18.7 Qualifications of the Advisor**

**18.7.1** If there is more than one advisor, both will have equal status as advisor. The advisors of post doc fellow should be professor. He/she must have following qualification:

Supervised or co-supervised or jointly supervised at least two Ph.D. scholars and published ten research articles in science indexed journals including at least 5 in the international journals

OR

Supervised or co-supervised or jointly supervised at least one Ph.D. scholar have at least one year post-doctoral research experience in abroad and published ten research articles in science indexed journals including at least five in the international journals.

OR

Supervised or co-supervised or jointly supervised at least one Ph.D. scholar and published fifteen research articles in science indexed journals including at least ten in the international journals.



**18.7.2** The number of post doc fellows to be advised by the advisors (alone or in collaboration) will be limited to be maximum two at a time.

**18.7.3** The advisor is not qualified to enroll a post doc candidate if his/her compulsory retirement durations is less than one academic year at Tribhuvan University.

### **18.8 Post-Doc Researchers Responsibility**

- (a) To conduct research activities as planned.
- (b) To take part on the additional teaching/research activities assigned by the advisor(s).
- (c) To present the research results in every three months in the department (group meeting or departmental seminar).
- (d) To submit research report to supervisor/CDRC within every three months. CDRC must forward the research report to IOST research committee.
- (e) To prepare and submit a manuscript of at least one research paper based on the research work carried out as post doc fellow at IOST, TU.
- (f) All procurements should be done following the standard procedure of TU.
- (g) All the equipments so procured must be handed over to the concerned Department of IOST after the completion of the research project.

### **18.9 Duration and Renew**

- (a) The postdoctoral position will be of one year and extendible for second year.
- (b) An extension of the second year will be approved by IOST Dean under the recommendation of advisor(s) forwarded by the CDRC. There must be satisfactory research work to be extended. The evaluation by CDRC should be based on research work of the fellow.

### **18.10 Advisors' Responsibility**

- (a) Organize post doc researchers' oral presentation in the department in every three months
- (b) Forward the progress and evaluation report of overall project of the post doctoral researcher in every six months to the Research Committee IOST through CDRC.
- (c) Assign the additional responsibilities of the research fellow, for example, lectures, tutorials, student supervision, whenever necessary

### **18.11 Role of CDRC**

CDRC forwards the funded proposal and other necessary documents of post doc to Research Committee of IOST. It organizes departmental seminars by the post doc fellow(s) of the department.

### **18.12 Role of Research Committee (IOST)/Dean IOST**

- (a) To provide letter of appointment after evaluation of the research proposal based on recommendation of supervisor/CDRC.
- (b) To provide letter of appreciation to the post doc fellow after finishing the project
- (c) To evaluate the progress reports and extend the period of the fellow.
- (d) To provide other necessary and related suggestions to improve the research activities of the fellow.

### **18.13 Funding**

Funding must be managed from sources within country or outside. It should be authorized by the respective advisors and approved by the IOST Dean. The post doc fellow will get fellowship or stipend from the funding according to the rules of the funding organization and mentioned in the proposal of the research project. It is not fixed, it will be approved by the IOST Dean as recommended by the advisor(s). The funds remain the corresponding department and it will be spent on the recommendation of advisor. The advisors are encouraged to plan

external funding scheme to establish post doctoral research activities at respective departments. The necessary expenditures to carry on the research by the post doc fellow have to be managed from the funds for the research work of the fellow.

There should be a mandatory provision of 10% administration service charge in addition to the overhead of the fund payable every year of the service.

## Appendix A: Curriculum of Ph.D. First Semester Course Work

<b>Course Title:</b>	<b>Research Methodology</b>	<b>3 CH</b>
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**Objectives:** Main objective of this course is to introduce doctoral students to the process of conducting academic research effectively. It is expected that the researcher will be able to learn how to think and act like a researcher in conceptualizing, designing, executing, and evaluating the scientific research projects.

### Course Outline:

**Unit 1: Introduction to Research Methodology:** Philosophical aspects of research methodology; Inductive and deductive research; Quantitative and qualitative research; Critical thinking & Creative thinking; Research paradigms

(5 Hours)

**Unit 2: Research Problems, Objectives & Hypotheses:** Problem Identification. Scientific research process, research objectives, formulation of research hypothesis, research hypothesis and statistical hypothesis, characteristic of research problem

(5 Hours)

**Unit 3: Reviewing the Related Literature:** Functions of literature review; Narrative review vs. Systematic review; Citation and referencing; Bibliography; Meta analysis

(4 Hours)

**Unit 4: Research Designs in Scientific Research:** Purpose of research design; Observational and experimental study designs; Systematic and random errors; Internal & external validity, and threats for validity

(5 Hours)

**Unit 5: Data Collection, Data Management & Statistical Analysis:** An overview of measurement & Scaling; Reliability & validity of the instrument; Methods of data collection; Data collection using attitudinal scales; Data processing; An overview of descriptive & inferential Statistics for Data Analysis; Qualitative analysis; Grounded theory; FGD; KII; Interpretation of the results with

reference to research problem; Role of computer and computer technology in research

(15 Hours)

**Unit 6: Writing an Effective Research Proposal and Research Report :** Purposes and components of research proposal; Guidelines for writing research proposal; GANTT chart; Evaluation of research proposal; Purposes, types and the format of research report; Guideline for writing an effective research report, evaluation of research report (5 Hours)

**Unit 7: Research Critique:** Meaning; Guidelines and phases of critical appraisal; Research article critique guidelines, and peer review of research articles (3 Hours)

**Unit 8: Ethical Issues:** Ethical considerations in research; Ethical issues; Ethical committees; Commercialization; Copyright; Intellectual property rights and patent law; Plagiarism (3Hours)

## References

- American Psychological Association. (2010). Publication manual of the APA (6th ed.). Washington DC, USA
- Best J.W.& Kahn J.V. (2002). Research in Education. New Delhi: Prentice-Hall of India
- Borenstein Michael, Hedges Larry V., Higgins Julian P.T., Rothstein Hannah R(2009) : Introduction to Meta-Analysis. Wiley Publication
- Carlos, C.M.(2000). Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
- Coley, S.M. and Scheinberg, C. A.(1990) "Proposal Writing", Sage Publications.
- Day, Robert A. (1996). How to Write and Publish a Scientific Paper. Cambridge University Press.
- Fink A. (2009). Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications
- Gibaldi Joseph (2000). MLA Handbook for Writers of Research Papers. New Delhi: Affiliated East-West Press Pvt. Ltd.
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- Kothari C.R. (2004). *Research Methodology*, New Delhi: New Age International (P) Limited, Publishers.
- Kumar, Ranjit (2011). *Research Methodology*. SAGE Publications Pvt. Limited, India
- Singh, Arun Kumar (2000). *Tests, Measurements & Research Methods in Behavioral Sciences*. New Delhi: Tata McGraw-Hill Publishing Company Limited.
- Young, Pauline V. (1994). *Scientific Social Surveys and Research*. New Delhi: Prentice-Hall of India Private Limited.

<b>Course Title:</b>	<b>Philosophy of Science</b>	<b>3 CH</b>
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The course of study on Philosophy of Science (PoS) teaches to examine the sciences from a number of perspectives, conceptual, historical and social. The course introduces the core issues in the philosophy of science, in particular the debate about the nature of scientific method, logics, and the demarcation of science from non-science. It introduces to the subject beginning mainly with the modern science in sixteenth century. Some key thinkers in philosophy of science, including those earlier ones where appropriate, are mentioned.

The course of study on PoS has been designed for the PhD research students of Tribhuvan University who have registered with the Institute of Science and Technology. They come from different disciplines of science. The teaching faculty includes both from natural science and social science. The modality of teaching is mainly seminar presentation and discussion. In the seminars, the participating students are encouraged to interact and assign for presentations. Assessment of the students' performance is as per TU-IOST guidelines.

## Course Content

SN	Unit	Course Contents	References
1	Epistemology of science (4 Hours)	<ul style="list-style-type: none"> <li>• Introduction to philosophy; Philosophy and daily life; Meaning of epistemology; Nature of knowledge; Approaches to knowledge, Views of some earlier philosophers (Confucius, Buddha, Socrates); Knowledge versus faith</li> <li>▪ Historical overview: Eastern philosophy (Hindu, Buddha), Oriental (Confucius), Middle east (Islam), Western philosophy (European), Others (African, Indigenous American)</li> </ul>	<ul style="list-style-type: none"> <li>• Hitchcock C. 2004. Introduction: What is the Philosophy of Science? In: Contemporary Debates in Philosophy of Science. Blackwell</li> <li>• Huemer M and Audi R. 2002. Epistemology: Contemporary readings. Routledge. (Selected chapters)</li> <li>• Stanford Encyclopedia of Philosophy</li> </ul>
2	Philosophy and Science (4 Hours)	<ul style="list-style-type: none"> <li>▪ Introduction: What is science; Basic assumptions in science</li> <li>▪ Scientific explanation: Instruments to scientific knowledge; Social accountability: Purpose and values of science</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bhuju, DR. 2020. Thesis Research and Writing. Northwest University, Xi'an</li> <li>▪ Machamer PM. 1998. Philosophy of Science: An Overview for Educators. Pittsburgh Univ. (Chapter 1)</li> <li>▪ Losee J. 1992. A Historical Introduction to the Philosophy of Science. Oxford University Press</li> </ul>

3	The Relation (or distinction) of Metaphysics to Epistemology (2 Hours)	<ul style="list-style-type: none"> <li>▪ General introduction to metaphysics</li> <li>▪ Problems of metaphysics: Old metaphysics and new metaphysics</li> <li>▪ Relationship of metaphysics and science</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stanford Encyclopedia of Philosophy</li> </ul>
4	Method of fixation of belief and scientific method (2 Hours)	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Historical and philosophical introduction to scientific method</li> </ul>	<ul style="list-style-type: none"> <li>▪ Peirce CS. 1877. The Fixation of Belief. Popular Science 12:1-15</li> <li>▪ Gower, B. 1997. Scientific Method: An historical and philosophical introduction. Routledge</li> </ul>
5	Methods and ways of argument (2 Hours)	<ul style="list-style-type: none"> <li>▪ Ontological and epistemological basis of reasoning; Idealism vs. Objectivism</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hurley PJ, 2014. A Concise Introduction to Logic. Cengage Learning</li> </ul>
6	Rationalism, empiricism, positivism, constructivism and /or philosophical paradigms (5 Hours)	<ul style="list-style-type: none"> <li>▪ Rationalism: Meaning, Background, Main figures, Main claims (intuition, innate knowledge, innate concept)</li> <li>▪ Empiricism: Concept, Major figures, Age of enlightenment; Rationalism vs Empiricism</li> <li>▪ Constructivism and Positivism</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stanford Encyclopedia of Philosophy</li> </ul>
7	Scientific explanation and rationality, falsificationism, inductionism (4 Hours)	<ul style="list-style-type: none"> <li>▪ Scientific explanation: Demarcation, Science, Pseudo-science</li> <li>▪ Falsification: Introduction, Major figure Karl Popper</li> <li>▪ Reductionism: Types, Rene Descartes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stanford Encyclopedia of Philosophy</li> </ul>



8	Role of logic and probability in science (4 Hours)	<ul style="list-style-type: none"> <li>▪ Introduction to Logic and Reasoning</li> <li>▪ Probability and Certainty</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hurley, PJ, 2014. A Concise Introduction to Logic. Cengage Learning</li> </ul>
9	Phenomenology and Technology (4 Hours)	<ul style="list-style-type: none"> <li>▪ Philosophy of Technology</li> <li>▪ Technology and Science</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hendricks VF, Pedersen SA, Friis JKBO. 2009. A Companion to the Philosophy of Technology. Wiley-Blackwell</li> </ul>
10	Technological pragmatism (4 Hours)		<ul style="list-style-type: none"> <li>▪ Hendricks VF, Pedersen SA, Friis JKBO. 2009. A Companion to the Philosophy of Technology. Wiley-Blackwell</li> </ul>
11	Logical theories of confirmation (4 Hours)	<ul style="list-style-type: none"> <li>▪ Component of Reasoning: Arguments, Premises, Conclusion</li> <li>▪ Inductive Reasoning: Meaning, Strength and Cogency of Inductive Reasoning</li> <li>▪ Deductive Reasoning: Meaning, Validity and Soundness</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hurley PJ, 2014. A Concise Introduction to Logic. Cengage Learning</li> </ul>
12	Objectivity of subjective judgment (4 Hours)	<ul style="list-style-type: none"> <li>▪ Objectivity in science; Role of scientific community; Critics</li> <li>▪ Subjectivity; Emotion, Ethics</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stefanidou C and Skordoulis C. 2014. Subjectivity and objectivity in science: An educational approach. Advances in Historical Studies 3: 183-193</li> <li>▪ Gutiérrez AML and Campos MV. 2015. Subjective and Ob-</li> </ul>

			jective Aspects of Points of View. Studies in Applied Philosophy, Epistemology and Rational Ethics 23
13	Ways of getting predictive accuracy in science (2 Hours)	Overview of predictive accuracy; Measuring scientific achievements; AIC (Akaike Information Criterion)	<ul style="list-style-type: none"> <li>▪ Forster M. 2002. Predictive accuracy as an achievable goal of science. Philosophy of Science 69 (S3)</li> </ul>

*Note: Teaching hours is given in the second column.*

## **Appendix B: INSTITUTIONAL REVIEW COMMITTEE, IOST, TU Standard Operating Procedure**

### **1. INTRODUCTION**

Institute of Science and Technology, Tribhuvan University is one of the oldest and the largest technical institutes in TU with 13 Central Departments, 1 School, 24 constituent campuses and 89 affiliated campuses. Nepal has a history of nine decades of science teaching/learning at the higher level. Students work on scientific research projects of varied nature at the postgraduate (M.Sc.) level and Ph.D. level. IOST and the Central Departments have linkages and coordination with different ministries and national/ international organizations and academic institutions. Central departments of Microbiology, Biotechnology, Chemistry, Zoology, Botany, Environmental Science and Statistics are conducting researcher related to human health whereas central departments of Physics, Mathematics, Hydrology and Meteorology, Geology, CSIT and Food technology directly enrolled human subjects in their researches. IOST, TU and CD of Microbiology have MOU signed with Asia Pacific Malaria Elimination Network (APMEN), Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand, Menzies School of Health, Australia, Stanford University, USA, Institute of Tropical Medicine, Antwerp, Belgium, University of Liverpool, UK etc.

One of the activities entrusted for Institutional Review Committee (IRC), IOST, TU is to review research proposals in Biological Sciences involving human subjects, to be conducted by the faculties and students of constituents and affiliated colleges of TU for the scientific quality and ethical values and to take the necessary steps to approve or disapprove such research proposals. In order to carry out this task, IOST, TU developed the Guidelines and constituted Institutional Review Committee (IRC) in accordance with the provisions made in the Guidelines.

In order to facilitate the work of IRC, a Standard Operating Procedure (SOP) has been developed. This SOP will guide the IRC to carry out its responsibilities in a consistent and smooth manner. The purpose of this SOP is to safeguard the dignity, rights, safety and well being of research participants and promote scientific and ethical health research in Nepal.

## **1. Functions and Duties of the IRC**

- 1.1 To review research proposals according to the NHRC Guidelines for Health Research in Nepal with a view to approve, amend or reject the proposal.
- 1.2 To regulate and monitor the implementation of health research projects approved by IRC, and implemented by the affiliated colleges, its faculties and students.
- 1.3 To advice appropriate resolution, if any, arising during implementation or monitoring of the implementation.
- 1.4 To promote culture of ethical practice health /biomedical research.

## **2. Office of the IRC**

- 2.1 IOST, TU has allocated a dedicated space for IRC office, where IRC is allowed to use email, phone, photocopy, cupboard and administrative staff of CDM.

## **3. Meetings**

- 3.1 Member Secretary of the IRC will prepare the agenda for the meeting in consultation with the Chairman of the IRC. The Member Secretary will also keep minutes of the meeting and notify decisions to the researcher. The Member Secretary will be assisted in his or her tasks by an administrative staff.
- 3.2 IRC will prepare a regular annual report.

## **4. Submitting the Application**

Individuals desirous of conducting microbiology research related to health in TU affiliated and constituents' colleges are required to submit their proposal to IRC.

## **5. Application Submission**

The student or Principal Investigator (PI) and/or the one responsible for the research will submit the proposal for review at IRC of IOST, TU.

### **5.1. Application Requirements Include**

- 5.1.1 Application: Application should be addressing to the Member Secretary of IRC.
- 5.1.2 Format for Application: Application should be submitted in the format provided by IRC.

- The prescribed format can be accessed from the website ([www.microbiotu.edu.np](http://www.microbiotu.edu.np)) of IRC.
- 5.1.3 Language of Applications: All Applications should be submitted in English.
  - 5.1.4 Applicant should include one hard copy and an electronic copy of the proposal.
  - 5.1.5 Only those applications fulfilling the requirements will be accepted for review. Deficits in the application shall be informed to the applicants within two weeks of submission. Incomplete applications will have to be resubmitted.
  - 5.1.6 A receipt of the accepted application will be provided to the researcher.
  - 5.1.7 Application Fee: Applications should be submitted along with processing fee (Rs. 500/-).
  - 5.1.8 Additional documents or changes: IRC can request the applicant for supplementary documents/or changes to the proposal during the review which will be communicated to the applicant and the application will be considered in the subsequent meeting after those changes are made by the researcher.
  - 5.1.9 Amendments: If any amendments are made in the proposal already submitted and approved, the researcher must submit in writing the changes made with reasoning. The proposal will be reviewed again in the IRC, taking the amendments in to consideration during there –approval process.
  - 5.1.10 Informed consent: Application should include the Informed Consent Form as a separate copy which is to be used while under taking the research. In addition, this can include a translation copy; in a Nepali language if that is applicable.
- 5.2 **Documents required**
- 5.2.1 The application form should be submitted with the signature and date of submission using the IRC format.

- 5.2.2 Application must include the most current version of the curriculum vitae of the Principal Investigator and co-investigators with special mention of academic qualification and research experiences.
- 5.2.3 Application must include the protocol of the proposed research project in the provided format together with the supporting documents (A copy of research tools, questionnaires etc).
- 5.2.4 A copy of informed consent form should be included in the application. This should include a detail description of the process of giving the information to the research participant and its content, process of obtaining the consent, the person responsible for obtaining the informed consent and documentation of the signature of the researcher/research participant and/witness if applicable.
- 5.2.5 Any compensation to be given to the research participant should be clearly mentioned. (e.g. any transportation costs, food, free health care or insurance coverage etc. that is to be borne by the researcher).
- 5.2.6 A signed statement by the researcher stating that he or she will abide by the ethical principles of research.
- 5.2.7 A declaration of the conflict of interest, if applicable, should be mentioned in the application.

## **6. Ethical Review Process**

The IRC will review all the submitted research proposals in biological sciences in a timely manner and in accordance with the set review process.

### **6.1 Meeting of the IRC**

The meetings of the IRC will be held at least once in a month. The Member Secretary of IRC with the permission of the Chairman will call the meeting. The followings are considered as applicable for a meeting:

- 6.1.1 The meeting of IRC will be planned in accordance with the workloads and number of

- proposals received for review.
- 6.1.2 IRC members will be informed about the meeting at least 72 hours prior to the scheduled date.
- 6.1.3 If felt necessary by the IRC, the applicant researcher or sponsor of the research can be invited to present the proposal or elaborate on specific issues of the proposal. Similarly, if necessary, experts can also be invited to the meeting for expert opinion about the research.
- 6.1.4 Minutes will be kept of all decisions and procedures of the meeting.
- 6.1.5 All the members and invitees present in the meeting should sign the minutes to indicate their presence.

## **6.2 Elements of the Review Process**

Once the application is submitted and screened for completeness of documents, technical review of the proposal is done by the internal reviewers for the scientific and technical contents. The application received after internal review is then subjected for review by the external reviewers. Those applications which qualify are then submitted to the Member-Secretary of the IRC and then discussed in full at IRC meeting for ethical review.

- 6.2.1.a The appropriateness of the study design in relation to the objectives of the study.
- 6.2.1.b Sampling method, sample size and analysis of data.
- 6.2.1.c Justification of predictable risks and in conveniences against the anticipated benefits for the research participants and community by the proposed study.
- 6.2.1.d Justification of the use of control arm (if relevant for the study).
- 6.2.1.e Criteria for prematurely with drawing research participants.
- 6.2.1.f Criteria for suspending or terminating the research.
- 6.2.1.g Plan for dissemination or publication of research results.
- 6.2.1.h Infrastructure and other facilities in the institutions conducting the research.
- 6.2.1.i Suitability of researcher's qualification and

- experiences for the proposed research.
- 6.2.1.j Description of the population from which the research participants will be drawn.
- 6.2.1.k Inclusion criteria for the research participants.
- 6.2.1.l Exclusion criteria for the research participants.
- 6.2.1.m Protection of research participants.
- 6.2.1.n Measures to ensure the confidentiality of the research participants
- 6.2.1.o Description about who has access to data and biological samples.
- 6.2.2 **Informed consent process**
- 6.2.2.a A full description of the process for obtaining informed consent including the description about who is responsible for obtaining the informed consent.
- 6.2.2.b Process of communication with there search Participants about the objectives, methods, risks and benefit of the research.
- 6.2.2.c Description about obtaining consent from the vulnerable research participant (e.g. children, elderly, disabled, prison population, people in uniform services, etc.).
- 6.2.2.d Description about the provision for the participants to queries and complaints during the course of research.
- 6.2.3 **Community considerations**
- 6.2.3.a The relevance of the research for the community from where research participants are drawn.
- 6.2.3.b The process taken for the consultation and communication with the community.
- 6.2.3.c Description about how the research results will be available to the community.

## 7. Decision Making

The IRC will consider the following while making decision about the research proposal

- 7.1 The IRC will make the decision only if the meeting has met required quorum.
- 7.2 Normally the decision will be taken by consensus, (if consensus is not possible then a vote will be taken).



- 7.3 The IRC member should withdraw from the decision process when conflict of interests arises; the member should declare the conflict of interest.
- 7.4 The IRC may approve the proposal conditionally with specific suggestions to the researcher.
- 7.5 The negative decision on a proposal should be supported by clearly stated reasons.

## **8. Communicating a Decision**

On behalf of the IRC, the Member Secretary will communicate its decision to the applicant in writing within two weeks after the meeting. The communication of the decision will include, but is not limited to the following information:

- 8.1 The exact title of the research proposal reviewed.
- 8.2 The clear identification of the protocol of the proposed Research or amendment, date and version number (if applicable) on which the decision is based;
- 8.3 The names and (where possible) specific identification numbers (version numbers/dates) of the documents reviewed, including the potential research participant information sheet/material and informed consent form;
- 8.4 The name and title of the applicant.
- 8.5 The name of the research site(s).
- 8.6 The date and place of the decision.
- 8.7 A clear statement of the decision reached.
- 8.8 Any advice by the IRC.
- 8.9 In the case of a conditional decision, any requirements by the IRC, including suggestions for revision and the procedure for having the application re-reviewed.
- 8.10 In the case of a positive decision the following is required:
  - 8.10.1 A statement of the responsibilities of the applicant.
  - 8.10.2 Confirmation of the acceptance of any requirements imposed by the IRC.
  - 8.10.3 Deadlines for the submission of progress report(s).
  - 8.10.4 The need to notify the IRC in cases of protocol amendments (other than amendments involving only logistical or administrative aspects of the study).

- 8.10.5 The need to notify the IRC in the case of amendments to the recruitment material, the potential research participant information, or the informed consent form.
- 8.10.6 The need to report unforeseen circumstances, the termination of the study, or significant decisions by other Ethical Committees.
- 8.10.7 The information the IRC expects to receive in order to perform ongoing review and deadlines for the submission of final report.
- 8.11 The schedule/plan of ongoing monitoring by the IRC.
- 8.12 In the case of a negative decision, clearly stated reason(s) for the negative decision.
- 8.13 Signature (dated) of the Member Secretary (or another Authorized person) of the IRC.

## **9. Follow up of the IRC**

IRC will establish a follow-up procedure for following the progress of all studies for which a positive decision has been reached, from the time the decision was taken until the termination of the research.

## **10. Documentation and Archiving**

All documentation and communication of IRC will be dated, filed, and archived according to written procedures. A statement is required defining the access and retrieval procedure (including authorized persons) for the various documents, files, and archives. The documents will be archived for a minimum period of 5 years following the completion of a study.

Approved by NHRC  
(27 September, 2019)