

Tribhuvan University
Institute of Science and Technology

**Central Department of Microbiology
Kirtipur, Kathmandu**



**M. Sc. Microbiology Dissertation Guideline
(Updated)**

First published- 2011

Revision 1- 2014

Revision 2- 2023

Name of the document: M. Sc. Microbiology Dissertation Guideline

Published by: Central Department of Microbiology, Institute of Science and Technology,
Tribhuvan University

Address: Kirtipur, Kathmandu, Nepal

Date of Publication: August, 2011

First Revision: August, 2014

Second Revision: December, 2023

© Central Department of Microbiology, Kirtipur, Kathmandu

CONTENTS

	Pages
Section I: Introduction	5
1.1 Background	5
1.2 Implementation of dissertation guideline	5
1.3 Minimum requirements of the dissertation	6
Section II: Procedures, Styles and Formats	7
Section III: Dissertation Research Proposal Writing	10
3.1 Format for Dissertation Research Proposals	10
Section IV: Dissertation Format	14
4.1 Technical Specification	14
4.2 Citations of Literature	19
4.3 Scientific Writing	20
4.4 Binding	23
4.5 Order of dissertation contents	24
Section V: Article Manuscript Preparation	34
Section VI: Dissertation Submission and Evaluation Procedure	38
Appendix- II: Format of Cover and Front Pages	40

PREFACE

This document is intended to provide guidelines to all M. Sc. Microbiology students of Tribhuvan University for the completion of their M.Sc. as a part of their degree requirements. The students must follow this guideline in order to complete their dissertation in a systematic manner. The guideline explains and illustrates the standard procedures to be followed during dissertation process from commencement of research proposal, laboratory work, thesis writing, submission and evaluation. It explains the general format and style requirements of the microbiology dissertation of Tribhuvan University.

The student should use the guideline in conjunction with the M. Sc. Microbiology curriculum. The respective department/campus must follow the minimal requirements set by this guideline during laboratory work, submission and evaluation of the dissertation.

The students are responsible for the accuracy of the content of their dissertation and should proofread and edit the dissertation for correct syntax, grammar, spelling, punctuation, references, as this guideline. The Tribhuvan University reserves the right to reject dissertations that are completed without following this guideline and contain errors or do not follow the minimum requirements as set by this document.

This guideline is produced in order to fulfill the need of the students and all the concerned. This is the revised guideline to accommodate the recent changes in regulations of the university.

Central Department of Microbiology

Tribhuvan University

December, 2023

Section I: Introduction

1.1 Background

Tribhuvan University initiated and implemented M. Sc. Microbiology Program in 1990 by establishing Central Department of Microbiology at University Campus, Kirtipur. At present many other colleges also offer M.Sc. degree in Microbiology. The dissertation research is mandatory for all M.Sc. Microbiology students of Tribhuvan University in partial fulfillment for the award of the degree of Master of Science in Microbiology.

This guideline has been prepared that includes current international trends and norms of scientific writing of microbiology related dissertation.

It is mandatory for the concerned institution to follow this guideline in order to maintain uniformity in dissertation research and to enhance the quality of M. Sc. dissertation, both in constituent department/ campus and affiliated colleges. This guideline includes the general procedures to be followed during inception of research, laboratory work, dissertation writing, submission and evaluation. It gives standard format of the dissertation document.

1.2 Implementation of dissertation guideline

This guideline has been prepared by Central Department of Microbiology, Tribhuvan University as per the curriculum requirement of Tribhuvan University. However, all other colleges that are offering M. Sc. Microbiology Degree of Tribhuvan University must follow this guideline. Dean's office, Institute of Science and Technology of Tribhuvan University and Microbiology Subject Committee will monitor the implementation of this guideline.

The Central Department of Microbiology reserves the right to explain, extend and amend the guideline as and when required.

1.3 Minimum requirements of the dissertation

1. The copy right authority of the M. Sc. Microbiology dissertation is reserved to Tribhuvan University.
2. The dissertation must form a distinct contribution to the knowledge of the subject and afford evidence of originality as a part of laboratory experiments. It must be of a satisfactory literary standard and must be suitable for publication as a dissertation of Tribhuvan University.
3. The dissertation must consist of the student's account of his/her own research. A student will not be permitted to submit a dissertation consisting wholly of work for which a degree has been conferred on him/her in this or any other University.
4. A research proposal, dissertation and article manuscripts must be submitted in a form as prescribed in this document.
5. It is the candidate's responsibility to prepare and assemble all materials for the dissertation, and to have the pages of the dissertation in correct order.
6. Close attention should be paid by the students so that the text and all illustrative materials should be clear and error free; and format and technical specification as guided by this document.

Section II: Procedures, Styles and Formats

Step 1: Inception of dissertation proposal

M. Sc. Microbiology students when admitted to fourth semester/second year will be notified by respective department/campus/colleges to submit their intension in possible areas of dissertation research related to their field of study as per M. Sc. Microbiology curriculum. The student should submit the outline of the research concept on his/her dissertation research.

Step 2: Appointment of supervisor(s)

The head of department of Microbiology of respective department/campus/college will appoint faculty members or experts with at least Masters or higher degree in Microbiology and related field, as the supervisor(s). The selection of supervisor(s) generally will be based on their expertise related to intended dissertation research. However, principal supervisor must be full time faculty member of microbiology of respective department/campus. In special circumstances, head of the department can appoint a new supervisor for ongoing dissertation or reshuffle the team of supervisors during the process at any time.

Step 3: Proposal writing, defense and approval of the dissertation proposal

After official announcements, the student shall write and prepare the proposal of dissertation research under the guidance of principal supervisor and with consultation to other supervisors. The proposal of dissertation research must be written in standard format given by this guideline. The department/campus/college will call for open defense of the proposals of dissertation research. Head of the department/campus chief/ principal/coordinator will chair the committee and all faculties (and, if required experts of related field from outside) will be the members. This committee will approve the proposal. If necessary, the student shall be asked to do corrections and amendments before the approval of the proposal. Under special circumstances, the head of the department can suggest to amend or revise the approved proposal. In the case of any dispute or difficulties, the final decision will be made by head of the department in regards of dissertation research and can approve or amend the research proposal or can ask to work in new proposal. The student must work as per approved or amended proposal and must follow the instructions from respective head of the departments.

Step 4: Obtaining ethical approval from Institutional Review Committee (IRC)

Every student must obtain ethical approval of the dissertation proposal involving human and animal subjects from the Institutional Review Committee (IRC) of Institute of Science and Technology or relevant ethics committees as required. Ethical approval should be obtained prior to start of the sample and data collection.

Step 5: Laboratory work

After the approval of the research proposal, the Head of department shall identify the potential laboratories for experimental works. The students will be posted to the identified laboratories and such laboratories should be well equipped, government recognized and Tribhuvan University recognized. However, the students should be encouraged to work in the Microbiology laboratories of their respective departments or campuses as far as possible.

Step 6: Progress report

The progress report of the dissertation will be submitted by the student to the Head of the Department through their supervisor(s).

Step 7: Dissertation write up

After the completion of research as per supervisor(s)' and department consent, the students will be informed to write the dissertation in a standard format. Along with the draft copy of dissertation student must prepare the manuscript of full length research article based on the data generated from laboratory work during his/her dissertation in a standard format as given in this document for future publication in an indexed peer reviewed microbiology related journal.

Step 8: Plagiarism clearance certificate

The student should obtain plagiarism clearance certificate before the submission of the dissertation.

Step 9: First draft dissertation submission and approval

The student must submit at least three copies loose bound or spiral bound of well prepared and signed dissertation with manuscript article to the department/campus/colleges for the approval. The Head of the department will approve and will subject for further process of examination and evaluation of the dissertation and manuscript on the basis of this guideline. The approval authority can return the draft dissertation to the student for necessary amendments before its approval.

Step 10: Evaluation and date of viva-voce open defense

The draft copy of the dissertation will be forwarded to internal examiner (one of the full time faculty member of microbiology at least having M.Sc. degree in Microbiology of the respective department/campus/colleges) and external examiner (appointed by Institute of Science and Technology, Tribhuvan University from the roaster of dissertation examiners). By the consultation with examiners, the department/campus/colleges will publish the date of examination as viva-voce open defense. In general, viva-voce open defense shall not be conducted before 7 days of appointment of an external examiner.

Step 11: Examination through open defense

The examination through open viva-voce defense will be held at respective department/campus/colleges unless otherwise is stated by the authority. The dissertation will be evaluated just after the public defense by the panel of external and internal examiners, Head of the department and supervisor(s). The panel of experts will evaluate the thesis independently. However, concerned authority of Tribhuvan University may be called as an observer.

Step 12: Corrections and preparation of the final draft

All the errors in the dissertation will be corrected by the student as per necessary instructions given by the board of examiners.

Step 13: Final submission

If the dissertation is rejected with major errors either in methodology and data results, resubmission should be done within 3 months of the examination date. In case of minor corrections, the final dissertation should be submitted within one month of the examination date. After corrections and signing the final copies of dissertation (at least five copies of hard bound) should be submitted to the department/campus/colleges. A soft copy of whole dissertation of finally approved or corrected and the research article in CD in MS Word or PDF format should be submitted to the concerned department. Only after the final submission and approval of the dissertation and an article, evaluation marks will be sent to the Examination Section of Dean's Office, Institute of Science and Technology, Tribhuvan University.

Section III: Dissertation Research Proposal Writing

Dissertation research proposal should be written in standard format as mentioned in this document. The proposal must be submitted for the original research work. There must not be duplication or repetition of previously accepted or published research work. Major part of the research should be based on experimental laboratory work on respective specialized field of Microbiology and should be focused from sample collection, preservation, isolation and identification of microorganisms and applied aspects of isolated cultures. If the sero-diagnostic test kits or molecular methods are only used for the research they must be standardized and validated. The result obtained by such methods shall be compared with one or more gold standard methods to check reproducibility of the result. However, students shall be encouraged to use both microbiological methods and molecular methods during their dissertation research.

The body of the research proposal shall not exceed 20 pages. This pagination does not include the Title Page, Summary, and Appendices i.e. the Introduction starts on a separate page, and is numbered page 1. The proposal shall be written in similar format as given for dissertation write up.

Every student must obtain ethical approval of the dissertation proposal involving human and animal subjects from the Institutional Review Committee (IRC) of Institute of Science and Technology or relevant ethics committees as required. Ethical approval should be obtained prior to start of the sample and data collection.

3.1 Format for Dissertation Research Proposals

1. Title Page

The title sheet should include the information ordinarily encountered on the title page of the dissertation except that the proposal should be labeled as a dissertation proposal, not as a dissertation. The title should be concise generally within 20 words as far as possible.

2. Summary

The proposal summary is expected to be brief (not to exceed 350 words) and should summarize the following: introduction, objectives, and proposed indicative methods and expected outcomes.

3. Introduction

This section introduces the domain of the study and provides a general overview of the circumstances, issues, and background leading up to the problem under investigation. The introduction section should include: -

- Background
- Rationale
- Objectives

The section should be written in a paragraph form without subheadings in journal article writing style except for objectives. While writing this section, the referencing should be done and for each statement the reference shall be written in bracket as mentioned in reference section of this document. The statement shall highlight why the present research is proposed and what is the genesis of research problem.

While writing objectives, the use of action oriented verbs are discouraged rather result oriented verbs are appreciated. General (broad) objective should be directly relevant to title of dissertation proposal. Specific objectives should be clear, concise and pin pointed (3 or 4 specific objectives based on hypothesis).

4. Literature review

This section should present brief and specific but critical review of relevant and recent literatures directly and/or closely related to the research theme of the dissertation. The student shall review current and relevant journal articles, books and other sources (e.g. dissertations, conference proceedings). The student should review at least five full length original research articles that are directly and/ or closely related to their proposed research. The student shall review M. Sc Microbiology dissertations submitted to TU that are closely related to their proposed research. Reference should be given for each statement in a standard format as mentioned and establish relevancy of his/her proposed research.

5. Methodology

It must include type of study, duration of study, laboratory settings, and research design in a paragraph in a journal article writing style.

However, samples and sampling methods including sample size calculation, experimental methods or laboratory methods and or data collection methods should be described in detail with separate sub headings as and when required.

The method section should be described under sub-headings- sample collection, transportation, preservation, laboratory analysis/sample analysis and or data collection, and data management and analysis etc. The experimental procedures shall be described in detail in order to fulfill the objectives of the research.

If the previously reported methods will be used for the experimental work for each preferred method reference should be given. The reference shall be written in bracket as mentioned in reference section of this document. Generally, techniques of isolation, identification of microorganisms shall be described. A complete description of the instruments or procedures used shall be mentioned when required. Separate list of materials is not required in this section but can be given in appendix. Generally, the list of chemicals/media, instruments, interview protocols (if any) developed by the researcher should accompany the proposal in an Appendix. Statistical analysis methods shall not be described in detail. However, if required the statistical tools and techniques used for data analysis or verification shall be mentioned briefly.

6. Expected outcome

Possible outcome of the proposed research should be postulated in this section. Expected outcome include enhancement in academic knowledge in proposed area of the study, utility of the research and direct or indirect benefits or as major discovery.

7. Work plan of the study

Gantt chart for the proposed time frame and activities of the study should be presented in this section.

8. Budgeting

Budgeting should be presented stating the expenses expected in the proposed research specially, the expenses of consumables and laboratory supplies. Budgets can be mentioned under multiple headings depending upon the nature of proposed study. However, every items and amounts allocated in the budget should be justified.

9. References

All studies cited for proposal writing should be listed in APA format. Only the references cited in the text should be included in the list of references.

10. Appendices (if necessary)

Any relevant information that is not accommodated in the main text section is provided in the Appendices. Students should consider the use of Appendices to present such items as instruments, consent forms, reagents, media and any other lengthy descriptions. If any of these documents are lengthy, they may be abridged.

Section IV: Dissertation Format

4.1 Technical Specification

1. Language

The dissertation must be written in **English language**. Spelling should be either US English or British English, but not mixture.

2. Dissertation length/volume

A typical dissertation length must be of 50 to 70 pages, but not less than 50 pages. This does not include preliminary pages, non-paginated pages (photograph, figures without text etc.) and appendices. While maintaining the page numbers of the dissertation, the chapters Introduction and Objectives, Literature Review, Materials and Methods, Results, Discussion, Conclusion and Recommendations and References should be numbered as paginated pages and shall be denoted by Arabic numbers. In general, Introduction should not be more than 5 pages and Literature Review should not exceed 15 pages. The Materials and Methods shall be at least 5 pages, the Results section should not be less than 10 pages, Discussion shall not be less than 5 pages, and References shall not be less than 5 pages.

3. Paper

The dissertation must be written on **one side** only of good quality white bond paper (Usually of 80g weight) of **A4 size (210mm x 297mm)**. The same grade of paper must be used throughout the dissertation.

4. Production of dissertation

Dissertations must be produced with printing done on a high quality printer. Only original copy or good and clean photocopies are acceptable.

5. Typeface and font size

Appropriate typeface for the dissertation is **Times New Roman**. The font size should be 12 point, and the same typeface must be used throughout the text. Font should not be scripted or italicized

except for scientific names or conventionally used for scientific terms and terms in a different language.

Bold print, upper case and 16-point font size should be used for chapter headings. **Bold** print, sentence case and 14-point font size should be used for sub-headings. Footnotes and text in tables, equations and formulae must be typed in 10-point font size.

6. Margins

The top, bottom and right margins should be 1" or 2.5 cm in width, and the left-hand margin should be 2" or 5 cm in width to allow for loss in binding. Right margin of the text should be justified.

7. Line Spacing

Line spacing of 1.5 must be used in between lines. However, two-line spacing must be used between paragraphs and sections. Single spacing is permitted within:

- a. Explanatory footnotes
- b. References (except between entries)
- c. Multi-line captions (tables, figures)
- d. Appendices
- e. Headings or subheadings

A new paragraph should be at least two lines at the bottom of the page. Otherwise, the new paragraph should start in a new page. The paragraph and title/sub-title spacing should be 1.5.

8. Pagination

- a. All pages should be numbered centrally 0.5" or 1.25 cm from the edge of the page at the bottom margin. Page numbers should appear by themselves and should not be placed in brackets, hyphenated or accompanied by other decorative devices.
- b. Pages should be numbered consecutively throughout the dissertation, including pages for tables, figures and texts.

- c. The preliminary pages (preceding Chapter I) must be numbered in consecutively in lower case Roman numerals (i, ii, iii,). The title page should not be numbered though it is counted as page i.
- d. The text pages must be numbered in Arabic cardinal numbers. Page 1 begins with the first page of the Introduction (or Chapter I) but not numbered. Subsequent pages should be numbered beginning with page 2. Each chapter should begin on a new page.
- e. Appendices are numbered consecutively in upper case Roman numerals at the bottom center of each page, starting with "I".

9. Chapter layout

The text in a chapter can be divided into major sections and sub-sections. The major sections and sub-sections are numbered according to following schemes:

Arabic numbers separated by period(s). The major sections are numbered as First level (e.g. 1., 2., 3.....), the subsections are numbered as Second level (e.g. 1.1, 1.2,.....), Third level (e.g. 1.1.1, 1.1.2, ...etc.), Fourth level (e.g. 1.1.1.1, 1.1.1.2, ...etc.).

Students must ensure that it is consistent throughout the dissertation and is limited to 4 levels as far as possible.

10. Tables

- a. The general format of table is simple 2 (MS word)
- b. The table number and accompanying title is placed above the body of the table and left justified.
- c. Table numbers should be given sequentially (e.g. Table 1, Table 2, etc.).
- d. Table titles should be focused, descriptive, and short.
- e. Excessively large and complex tables that require multiple pages are discouraged, but if necessary, secondary pages should state "Table X continued" and repeat the headings.

- f. Table footer legends are used to explain symbols, notes on a statistical analysis, definition of abbreviations, amplify certain aspects of the table, or recognize sources.
- g. The text should cite a table when those data are noted.
- h. When necessary, a smaller font may be used to allow the entire table to fit on one page.
- i. When placing tables or illustrations horizontally (landscaped):
 - They must face the reader when turned 90 degrees to the right/clockwise (i.e., when in standard reading orientation, the top of the table should be on the left side of the page).
 - Page numbers must remain in the same position as the pages of regular text, i.e., at the bottom of the un-rotated page.

11. Figures

- a. Figure captions should be placed immediately below the figure. This includes the figure number (e.g., Figure 1) followed by a concise, descriptive statement.
- b. Figure numbers should be given sequentially (e.g. Figure 1, Figure 2, etc.).
- c. Colour can be used in graphs and maps. If color is used, originals must be provided for all copies.
- d. Generally, a figure shall occupy a separate page without page number. However, if it is integrated within a page of text (with page number), there must be sufficient space before and after to clearly set it apart from the text.
- e. The text should cite a figure when those data are noted.

12. Photographs

- a. The pages of the photographs, photomicrograph and glossy prints etc. should be placed after the chapter IV (Results) and before the chapter V (Discussion).
- b. The recommended size of the photograph is 10x15 cm.
- c. Photograph, photomicrograph, gel photograph and glossy prints not produced on the regular dissertation paper should be mounted in such a manner as to ensure permanency. The photographs should not be pasted instead the scanned copy of images should be printed in glossy paper.
- d. Photograph numbers should be given sequentially (e.g. Photograph 1, Photograph 2, etc.).
- e. Photograph captions should be placed immediately below the photograph including sample number and the brief description.
- f. Page number should not be given for the photograph pages.

13. Use of color

Coloured graphics may be used when appropriate. However, all copies of the dissertation must be identical and adhere to printing specifics outlined in this document.

14. Correction of errors

- a. A dissertation must be free of typographical errors. Corrections made in ink or with opaque fluid are not acceptable.
- b. Additions of words or phrases must not be typed between lines or inserted by hand. The whole page must be re-typed to incorporate the additions.
- c. Pages which are obviously insert pages are not acceptable. The surrounding pages should be re-typed to incorporate the material.

4.2 Citations of Literature

The most important consideration in citation of references in a text is consistency. The American Psychological Association (APA) format is recommended to provide information for readers to locate the source of information listed in selected references at the end of dissertation.

Examples:

i) For journal articles with one author

- a. Pradhan (2009) evaluated the definite role of enzymes in metabolism of ...
- b. In a study, the role of enzymes was evaluated in metabolism (Pradhan, 2009) ...

ii) For journal articles with maximum two authors:

- a. *Pseudomonas aeruginosa* was isolated from 43% males and 47% females (Anjum and Mir, 2010); and
- b. Anjum and Mir (2010) reported 43% isolation of *Pseudomonas aeruginosa* from males and 47% from females; and

iii) Citation more than two authors:

- a. Amutha et al. (2009) reported 95.0% resistance to at least one third generation cephalosporin's amongst the MDR isolates.
- b. At least, 95.0% resistance to at least one third generation cephalosporin's amongst the MDRisolates (Amutha et al., 2009)

et al. can only be used in the text to replace authors' name, however full listing of the authors' names should appear in references section.

iv) Citation more than one work:

- a. The overall prevalence of *H. pylori* infection was 56.8% (Kawasaki, 1998) using serology, 33.9% (Makaju, 2005; Smith et al., 2011; Weiss et al., 2005) using histology.
- b. Kawasaki (1998) and Makaju (2005) reported the overall prevalence of *H. pylori* infection was 56.8% using serology, 33.9% using histology respectively.

v) Same author, same year, different title:

Dave RL (2004a). Managing information ...

Dave RL (2004b). Multimedia management ...

vi) Same author different year:

In the text (Makaju et al., 2005, 2006; Smith et al., 2011, 2012)

- a. Makaju, R.K., Tamang, M.D., Sharma, Y., Sharma, N., Koju, R. and Ashraf, M. (2005). Prevalence of *Helicobacter pylori* in Dhulikhel Hospital, Kathmandu University Teaching Hospital: A retrospective histopathologic study. *Kath Univ Med J* 3(4):355-359.
- b. Makaju, R.K., Tamang, M.D., Sharma, Y., Sharma, N., Koju, R., Bedi, T.R. and Khanal, S. (2006). Comparative study on a homemade rapid urease test with gastric biopsy for diagnosis of *Helicobacter pylori* infection. *Nep Med Col J* 8(2):97-100.

4.3 Scientific Writing

Scientific writing should be clear, objective, accurate and concise.

1. Voice and verb tense

- a. The writing should be simple and easy to understand. The style of the writing itself should be relatively formal - the use of slang and the overuse of contractions should be avoided. Scientific writing has traditionally been written in a passive voice. The pronouns “I,” “We,” and “They” should typically not be used.
- b. Everything that the researcher has performed is described in past tense. This includes the summary of the experiment performed (the abstract), description of the materials and methods used to perform the experiment, and the results obtained from the experiment. The present tense is reserved for the researcher’s conclusions about the experimental results, conclusions of

previous researchers, and any facts that are generally accepted by the scientific field. The present tense is used in parts of the introduction and the discussion.

2. Microbial nomenclature

- a. The Latin binomial name of micro-organisms, plants and animals must be given at first mention in the text; thereafter the generic name will be abbreviated in such a way that confusion is avoided when dealing with several genera all beginning with the same letter, viz. *Pseudomonas*, *Proteus*, *Pediococcus*, etc. Subspecies are italicized (*Corynebacterium diphtheriae* subsp. *mitis*; groups and types are printed in Roman and designated by capital letters or Arabic figures (e.g. *Staphylococcus aureus* group A). Subsequently the name should be written with the genus (abbreviated) followed directly by the species name (for example *S. aureus*, *P. aeruginosa*).
- b. The common names will neither have an initial capital letter nor be underlined in the dissertation, viz. Pseudomonads, Salmonellas. The specific name will be given in full in the captions to tables and figures. Major ranks are written in Roman with an initial capital (e.g. Enterobacteriaceae).
- c. At the first citation of a serotype the genus name is given followed by the word 'serotype' and then the serotype name. Names of serotypes should be in Roman type with the first letter capitalized (for example *Salmonella* serotype Typhimurium). Subsequently the name should be written with the genus (abbreviated) followed directly by the serotype name (for example *S.* Typhimurium).
- d. The naming of viruses is according to International Committee on Taxonomy of Viruses (ICTV). The ICTV currently requires that the English common name, rather than a Latinized binomial term, be used to designate a viral species. For example, HIV is classified as family Retroviridae, genus *Lentivirus* (italics), and species Human Immunodeficiency Virus.

3. Genetic nomenclature

- a. Gene names are designated with 3 letters that form a mnemonic descriptive of gene function viz. *his* for histidine biosynthesis. If more than one gene product contributes to a specific function, then capital letters are used. The phenotype designation is not italicized.
- b. Alleles are designated with numbers. e. g. *hisG251* is different than *hisG252*.
- c. Deletions are noted with the Greek capital letter Delta (Δ). viz. A Δ (*hisG-hisD*) is a mutation encompassing the *hisG* and *hisD* genes.
- d. Insertions are designated with: e. g. *hisG9425::Tn10*.

- e. Antibiotic sensitivity is referred to as s (sensitive) versus r (resistant). e. g. Amp^r denotes an ampicillin resistant strain.

Nucleotide sequences

- a. Nucleotide sequence data should be deposited in the EMBL/GenBank/DDBJ Nucleotide Sequence Data Libraries and the accession number referenced in the dissertation.
- b. Sequence data should only be included if they are new (unpublished), complete (no unidentified nucleotides included) and if the sequence information itself provides important new biological insights of direct relevance to the question addressed in the manuscript. Generally, sequences should not be submitted if the same gene has been reported in another species unless a comparison with related sequences contributes important new information.
- c. Presentation of nucleotide sequences should include clear indications of nucleotide numbers and points of interest, e.g. promoter sequences, ribosome binding sites, mutations, insertions, probe sequences, etc. In the case of comparisons, nucleotides which differ between the sequences should be readily visible to the reader, e.g. by the use of bold face, shading, boxing or by the use of a dash to represent identical nucleotides. The font size used in the manuscript should facilitate appropriate reduction of the figure.

4. Writing convention

a. Units of measure

Arabic numeral should be used before measurement units and should not be spelt out, e.g. 5 kg, not five kg. Exemption is given to the first word of the sentence.

b. Numbers

All numbers should be spelt out unless they are followed by units of measure. Arabic numeral should be used for number 10 or more than 10. If sentence begins with a number, the number should be spelt out. e.g., “three replications had been made for the following experiment”.

4.4 Binding

1. Draft dissertation

- a. The draft copies of dissertation should be in spiral or other loose binding with plastic sheets on the both side.
- b. The coloured chart paper is not permitted for printing cover page or title page.
- c. The cover page design should be as the format (appendix).
- d. The dissertation proposal and article manuscript should not be bound.

2. Final dissertation

- a. The final copies of dissertation should be in permanent hard binding form in standard format.
- b. The colour of the final hard bound cover of the dissertation shall be black. The binding should be as for a book in which pages are permanently secured. The cover page shall be lettered in gold with Arial typeface and font size of 18 point.
- c. The design of cover page shall be as given in the format.

4.5 Order of dissertation contents

The following items must appear in this exact order

1. Preliminary Pages

- Cover Page
- Title Page
- Declaration
- Recommendation
- Certificate of Approval
- Board of Examination and Certificate of Approval
- Acknowledgements
- Abstract (Both in English and Nepali language)
- Table of Contents
- List of Tables
- List of Figures
- Abbreviations

2. The Text of the Dissertation

Chapter- I: Introduction and Objectives

Chapter- II: Literature Review

Chapter: III: Materials and Methods

Chapter- IV: Results

Chapter- V: Discussion

Chapter- VI: Conclusion and Recommendations

3. References

4. Appendices

Preliminary Pages

1. Cover and title pages

Title of the dissertation must be all in upper case and single-spaced. The student's name, also all in upper case, must be identical on the cover and title page. The area of specialization may be shown in parentheses following the major (in mixed case) where such breakdowns exist: e. g. MICROBIOLOGY (Medical/Environment and Public Health/Food/Agriculture etc.). Name of the Department/Campus/College, University (upper case), T.U. registration number, examination symbol number of fourth semester and year of submission should be mentioned.

2. Declaration

This page includes the declaration of originality and ethical conduct of dissertation research by the student. The student should declare it with the signature and date in prescribed format given below.

3. Recommendation

This page includes the recommendation of supervisor(s). General format of dissertation is applicable for the page. Name of the student and title of the dissertation should be same as the cover/title page and both should be in bold type face. The supervisors' name, title/designation, name of institution and address and signed with their signature and date must be included.

4. Certificate of approval

The submitted dissertation must be approved prior to evaluation. The certificate of approval is signed by Head of Department/Campus Chief/ Principal/Coordinator. General format of dissertation is applicable for the page. Name of the student should be in bold. Title of the dissertation should be same as cover/title page, uppercase and bold. It should be printed in letter head of the department/campus/college.

5. Signature of board of examiners

This page is utilized during the evaluation of the dissertation. Signatures of members of the board of examiners should be in order- Recommended by (Supervisor/s,), Approved by (Head of Department/Campus Chief/ Principal/ Coordinator), and Examined by (External Examiner and Internal examiner) with their full names and designations (after the examination).

6. Acknowledgements

The acknowledgments are brief notes of appreciation for technical, financial or research assistance given to the student during the dissertation and during write up of the dissertation. The students should acknowledge supervisors, Department head/head of the institutions, laboratory authorities and others who directly or indirectly contributed in the research and preparation of dissertation. It should be simple and sincere. It should be limited to a single page write up. The source of secondary data, personnel communications, or sources of literatures should be duly acknowledged. The full name of the student, signature and date must be mentioned.

7. Abstract (सोधसार)

The abstract should be both in English and Nepali language. The abstract is a concise and descriptive summary of the work completed. It should begin with a brief but precise statement of the problem or background; followed by objective, description of the research method and design, results and conclusions. Non-structured format of dissertation is applicable for the abstract. Abstract should be completed in one page. An abstract should not include internal headings, parenthetical citations of items listed in the reference section, diagrams, or other illustrations. Key words should be relevant to the research and should be three to seven. The Nepali version of the abstract should be written using Nepali grammar. Technical words if available in Nepali language should be written otherwise those can be written in English. Language translator tools such as google, chat GPT should not be used for Nepali translation of the abstract. The Nepali abstract should be typed in Unicode.

8. Contents

The contents must provide the page location of the preliminary pages, each chapter or headings and sub-headings, references, and appendices.

It contains the list of all the chapter titles, normally in upper case, preceded by their numbers in Roman or Arabic numerals. Subheadings should be in lower case except as required for initial letters. It is recommended that not more than three levels of subheadings be included in the contents (chapter names are level 1 headings, subheadings of a chapter are level 2 headings, subheadings of subheadings are level 3).

Subsections of chapters may be numbered with Arabic numbers separated by period(s) or a combination of numerals and letters.

9. List of tables

The list of tables includes the listing of tables (Table number, Title, and Page) contained in the dissertation. The table number and title of captions of all tables must be same as in text of the dissertation. Even if there is only one table in the dissertation, list of tables must be made.

10. List of figures

The list of figures includes graphs, charts and maps. Figures should be listed with figure number, title and page number. Figure number and title should be exactly as mentioned in the dissertation text. Even there is a single figure; it must be mentioned in the list of figures. The list should be limited to a single page as far as possible.

11. Abbreviations

If abbreviations or other symbols are used, they must be used consistently and uniformly throughout the dissertation. When many abbreviations are used, List of Abbreviations with appropriate definitions should be included. These abbreviations must be valid and acceptable. The list should be sorted in alphabetical order. Universally recognized scientific symbols (cm, mm, kg, etc.) need not be listed. The list should be limited to a single page.

12. The Text of the Dissertation

Chapter-I: Introduction and Objectives

Chapter- II: Literature Review

Chapter- III: Materials and Methods

Chapter- IV: Results

Chapter- V: Discussion

Chapter- VI: Conclusion and Recommendations

References

Chapter I: Introduction

- 1.1 Background: This is the introductory chapter that indicates the brief introduction of subject matter, statement of problem of genesis of research, its importance, validity, research strategy. It sets forth the context, the hypotheses to be tested, and the contribution to knowledge or expected outcome of the research.
- 1.2 Objectives: The research objectives to be attained are clearly mentioned in this section. General (broad) objective must be directly relevant to the title. Specific objectives must be result oriented and pin pointed.

Chapter II: Literature Review

The chapter critically reviews the available literatures related to the topic of the dissertation in order to derive and develop the problem statements and research strategies. A literature review surveys scholarly articles, books and other sources (e.g. dissertations, conference proceedings) relevant to a particular issue, area of research, or theory, providing a description, summary, and critical evaluation of each work. It is the base for the experimental or analytical section of the dissertation and is to offer an overview of significant literature published on the topic. Literature selected must be upto-date, analyzed and synthesized logically. The students should write with their own words. The articles, books or other literatures should be recently published as far as possible. The students are encouraged to review original research articles published in indexed peer reviewed international journals related to microbiology with high impact factor that are closely or directly related to their dissertation.

Chapter III: Materials and Methods

This chapter describes the methods and techniques used during laboratory experiments for generation and validation of data in dissertation. It must include type of study, duration of study, laboratory settings, and research design in a paragraph without sub-heading in a journal article writing style. However, samples and sampling methods, data collection methods, experimental methods such as sample processing, culture, identification methods, typing methods etc. with required detailed descriptions of methodologies used during the research should be described in separate sub-headings. Separate list of materials is not required in this section but can be given in appendix.

Chapter IV: Results

It presents a systematic and orderly description of findings of the study obtained by the standard methodology and their meaningful analyses either in the form of figures, tables or text. Each of tables or figures must be accompanied closely with the text highlighting the key information. Results may consist of subheadings depending on the number of experimental work and/or parametric studies conducted. The tabulation, figures, text presentation should not repeat the same findings. The results must be presented briefly in text as far as possible. However, shall be indicated by tables, figures for detail description. The same result shall not be repeated in all forms (text, table, figures).

Chapter V: Discussion

This chapter discusses the results of the study in relation to the hypotheses and their scientific interpretations. It highlights the major findings, their significance and implications. Validation and justification of findings/results is done by comparing with relevant findings published in previous literatures. Reasoning and logics with major findings should also be discussed. Each of the findings/results may contain discussion depending upon their significance and utility.

Chapter VI: Conclusion and Recommendations

The conclusion section sums up the key findings and meanings obtained from the research. It should be based on objectives and very much specific. The data of the results should not be repeated.

Recommendations include applications of the major findings of the study and specific areas for further research. It should strictly be based on the results obtained in the dissertation. Recommendations should be presented in the numbered points in the order of priority.

References

The dissertation should contain appropriate documentation – that is, references to original literature relevant to the research presented in the dissertation. The reference citation and reference list should be in APA format.

The list of references should follow following format.

- a. The heading "References" must appear at the top of the first page. The heading must be bold, centered, and without punctuation.
- b. List of references (literatures) should begin the two spaces below the heading.
- c. Arrangement of references should be in alphabetical order by author's surname.
- d. Single space within each entry and single space between entries should be given.
- e. A single entry must not split over two pages. If an entire entry does not fit on one page, the entire entry is placed on the next page.
- f. These pages are counted and numbered in Arabic numerals.
- g. Every reference cited in the text should be listed in the reference section that follows the main body of the dissertation. Likewise, citation which is not mentioned in the text should not be listed in reference section. This one-to-one correspondence between citations and listing of references is essential.

Examples

Single author

Author, A. (Year). Title of the article. Title of the Journal, *volume number* (issue number), page range.

For example:

Taglialegna, A. (2023). *Pseudomonas* against cancer. *Nat Rev Microbiol*, 21(131).121-132.

Two authors

Author, A., & Author, B. (Year). Title of the article. Title of the Journal, *volume number* (issue number), page range.

For example:

Pandey, A., & Galvani, A. P. (2023). Exacerbation of measles mortality by vaccine hesitancy worldwide, *Lancet Glob Health*, 11(4), 478-479.

More than two authors

Author, A., Author, B., Author, C., Author, D. & Author, E. (Year). Title of the article. Title of the Journal, *volume number* (issue number), page range.

For example:

Jarvis, J. N., Lawrence, D. S., Meya, D. B., Kagimu, E., Kasibante, J., Mpoza, E. & Rutakingirwa, M. K (2022). Single-Dose Liposomal Amphotericin B Treatment for Cryptococcal Meningitis. *The New England journal of medicine*, 386(12), 1109–1120.

Books

1. Book with One Author:

Smith, J. D. (2020). *Microbiology: Fundamentals and Applications*. Wiley.

2. Book with Two Authors:

Johnson, A. B., & Williams, C. L. (2019). *Essential Microbiology: An Integrated Approach*. Pearson.

3. Book with Three or More Authors:

Smith, J. D., Johnson, A. B., Williams, C. L., Brown, M. K., & Davis, R. S. (2018). *Microbial Ecology: Principles and Applications*. Springer.

4. Edited Book:

Brown, M. K., & Davis, R. S. (Eds.). (2021). *Microbial Diversity and Biotechnology*. Academic Press.

5. Book with an Organization as the Author:

American Society for Microbiology. (2017). *Microbiology: Principles and Explorations*. ASM Press.

6. Translated Book:

van Leeuwenhoek, A. (1677/2015). *Microscopical Observations of the Structure and Growth of Plants*. Translated by S. J. Winslow. Dover Publications.

Chapter in a book

Author(s) of the chapter. (Year). Title of the chapter. In Editor(s) of the book (Ed. or Eds.), Title of the book (pp. page range of the chapter). Publisher. DOI (if available)

For example:

Smith, J. D. (2020). Microbial Diversity in Extreme Environments. In A. B. Johnson & C. L. Williams (Eds.), *Microbial Life in Extreme Environments* (pp. 45-67). Springer.

Thesis and Dissertations

Author. (Year). Title of the thesis or dissertation (Doctoral dissertation or Master's thesis). Name of the institution.

Rijal, A. B. (2019). *Isolation and Characterization of Novel Bacterial Strains from Extreme Environments* (Master's thesis). Department of Microbiology, ABC University.

Maharjan, J. D. (2021). *Exploring Microbial Communities in Soil Ecosystems* (Doctoral dissertation). XYZ University. <https://www.example.com/thesis>

Symposia, Conferences, etc

Author(s) of the paper or presentation. (Year). Title of the paper or presentation. In Editor(s) of the proceedings (Ed. or Eds.), Title of the Conference/Symposium Proceedings (pp. page range of the paper or presentation). Publisher.

For example:

Smith, J. D., & Johnson, A. B. (2022). Microbial Safety in Food Processing. In C. L. Williams & D. E. Davis (Eds.), *Proceedings of the International Symposium on Food Microbiology* (pp. 45-57). Springer.

Publication in the web

Author (if available). (Year, Month Day). Title of the web page or document. Name of the Website. URL

World Health Organization. (2021, June 15). Laboratory biosafety guidance related to coronavirus disease (COVID-19): Interim guidance. WHO. <https://www.who.int/publications/i/item/WHO-WPE-GIH-2021.1> Accessed 25 August 2023.

Appendices

An appendix should include materials that supplement the main text of the dissertation. It may include

- Supplementary original data, summary tabulations
- Questionnaires
- Ethical approval letter and consent forms
- Illustrative materials
- Descriptions of equipment
- List of microbiological media, chemicals and reagents
- Detailed description of kits
- Statistical analyses
- Detailed derivation of equations
- Computer software products/printouts
- Other relevant information

Similar material should be gathered in a single appendix.

- a. Number the appendices consecutively either alphabetically (Appendix A, Appendix B...).
- b. The heading Appendix A (or B, C) and the title of the material must be bold, centered, and without punctuation.
- c. The appendix material should begin four spaces below the heading.
- d. List each appendix and its title separately in the Table of Contents.
- e. The pages are counted and numbered in roman numerals (I, II, III...).

Section V: Manuscript Preparation

1. The preparation and presentation of manuscript

The manuscript of a full length research article based on data /result generated during dissertation must be submitted by the students along with the dissertation document submission as in the format given below. Manuscripts should be drafted as concisely as possible. Supervisor(s) should be included as co-author(s) in the manuscript as well as in any intended research article publication(s) based on dissertation. English language used in the manuscript should be of a publishable standard.

2. Format of papers

The manuscript must be typed double-spaced on A4 size white paper with Times New Roman font, size of 12 points. Individual papers have a limit of approximately 4000 words, including figures and tables. The pages should be numbered consecutively beginning with the title page. The first page should show

- a. The title
- b. Name(s) of author(s) and place(s) where the work was done
- c. The name, complete mailing address, email address, telephone and fax numbers of the author to whom all correspondence should be addressed and who will check the proofs

3. Order of the manuscript

The manuscript will have the following sections:

- a. **ABSTRACT:** A brief summary of about 150-200 words, should give the major findings of the investigation under the following headings: Objectives; Methods; Results; Conclusion. A list of between four and six keywords should be added.
- b. **INTRODUCTION:** A balance should be maintained between the pure and applied aspects of the subject.
- c. **MATERIALS AND METHODS:** Ensure that the work can be repeated according to the details provided. By submission of a manuscript, the authors consent that biological material, including plasmids, viruses and microbial strains, unobtainable from national collections will be made available to members of the scientific community for non-commercial purposes subject to National and International regulations governing the supply of biological material.
- d. **RESULTS:** Well-prepared tables and figures must be a feature of the 'Results' section because they convey the major observations to readers. Same information should not be provided both in

tables and figures. Attention on the importance of the principal findings of the study should be focused in the text.

- e. **DISCUSSION:** This must not recapitulate the results and should explain the meaning of results.
- f. **ACKNOWLEDGEMENTS:** The source of secondary data references and any kind of individual and institutional technical and financial assistance should be duly acknowledged.
- g. **REFERENCES:** Citation of references should follow APA style.

4. Layout of references

The APA style should be used for referencing.

5. Abbreviations and units

The journal uses SI units: g/l; s (time units) but week and year in full; probability is p; centrifugation conditions relative to gravity (g or rpm). Please refer to the Biochemical Journal 'Instructions to Authors' www.biochemj.org/bj/bji2a.htm.

6. Scientific writing

Scientific writing style should be as similar as prescribed for the dissertation.

7. Statistics

Wherever necessary, statistical tools can be used. Tests must be presented clearly to allow a reader with access to the data to repeat them. It is not necessary to describe every statistical test fully, as long as it is clear from the context what was done.

8. Tables

Tables must be prepared using the same word processing package as the manuscript text. They should not be embedded but be placed immediately following the main text. Tables must not include ruled vertical or horizontal lines with the exception of headers and footers. The use of explanatory footnotes is permissible and they should be marked by the following (shown in order of preference): *, †, ‡, §, **, †† etc.

9. Figures

Figures may be line drawings or photographs. Do not embed figures in the text. All graphs, charts and diagrams must be submitted in a finished form and at their intended publication size. Symbols or keys representing data series in graphs and charts must not be shown on the figure itself but be included in the legend typed on a separate sheet.

10. Photographs

These must be of good quality and high contrast. The magnification must be indicated by adding a bar representing a stated length. Composite photographs can reduce the numbers that require publication. The figures illustrating SDS-PAGE and agarose gels, with multiple lanes, where lane order has been rearranged using digital imaging software will not be accepted. The figure should also show sufficient of the gel to reveal reference markers (e.g. the sample origin and a tracker dye, or a lane of molecular mass markers). Captions should be set out in the same manner as that used for figures.

11. Supporting data

Data that is integral to the paper must be made available in such a way as to enable readers to replicate verify and build upon the conclusions published in the paper. Any restriction on the availability of this data must be disclosed at the time of submission.

Data may be included as part of the main article where practical. Data for which public repositories are widely used, and are accessible to all, should be deposited in such a repository prior to publication. The appropriate linking details and identifier(s) should then be included in the publication and where possible the repository, to facilitate linking between the article and the data. If such a repository does not exist, data should be included as supporting information to the published paper or authors should agree to make their data available upon reasonable request.

12. Footnotes

Footnotes are not permitted anywhere in the dissertation and article manuscript except on the first page of manuscript where they are used to show the address of author for correspondence.

13. References

These should be kept to the pertinent minimum, and arranged in alphabetical order by first author. Identify references in text, tables and legends by: Jones (2000), Jones et al (2000), Jones and Michel

(2000), or (Jones et al 2000) etc. The references must be verified by the author(s) against the original documents. Titles should be abbreviated in accordance with the style used in Index Medicus. The format for listing of references should be similar as prescribed for dissertation.

Section VI: Dissertation Submission and Evaluation Procedure

M. Sc. Microbiology students shall submit their dissertation not before a month of date of publication of results of examinations of M. Sc. Microbiology fourth semester/second year. In case of regular students, the dissertation can be submitted only if the candidate has already passed all papers of both the years.

1. First draft submission

- a. Three copies of the dissertation in temporary bound form (spiral or loose binding) along with article manuscript should be submitted through the supervisor(s) to the concerned Head of the Department/Campus chief/Principal.
- b. The dissertation should be certified by the supervisor(s) by signing page of recommendation.
- c. The Head of Department/Campus Chief/Principal will approve the dissertation and manuscript on the basis of this guideline.
- d. If not, the draft dissertation will be returned to the student for necessary amendments and resubmission.

2. Examination through open defense and viva-voce

- a. The draft copy of the dissertation will be forwarded to Examination Section of Dean's Office of Institute of Science and Technology, Tribhuvan University.
- b. The Dean's office appoints external examiner from the roster of dissertation examiners prepared and updated as per rule and regulations of the university. The Head of Department /Campus Chief /Principal shall appoint an internal examiner from the full time faculty members of Microbiology at the concerned department/campus/ colleges.
- c. The dissertation copies and manuscripts will be provided to internal examiner and external examiner for evaluation.
- d. By the consultation with examiners, the department/campus/colleges will publish the notice for viva-voce examination through open defense.
- e. In general, unless or otherwise in special circumstances, such date of examination will be within a month from the date of approval of the dissertation. However, in general the viva-voce examination shall not be held before one week from the date of appointment of external examiner by Dean's office.

- f. The viva-voce open defense will be held at respective department/campus/colleges unless otherwise is stated by the authority. The dissertation defense ceremony will be chaired by Head of Department/Campus Chief/Principal. External and internal examiners, supervisor(s) will present during the ceremony. Concerned authority of Tribhuvan University may be called as an observer.

3. Evaluation

- a. The dissertation proposal, dissertation manuscript and article manuscript will be evaluated. The evaluation sheet has prescribed in appendix of this guideline.
- b. The dissertation will be evaluated after the open defense by the board of examiners (external and internal examiners, Head of the Department/Campus Chief/Principal and supervisor(s) at least one full time faculty member of microbiology.
- c. The examiner(s) shall send the evaluation report to the Examination Section of Dean's Office of Institute of Science and Technology of Tribhuvan University through Head of Department/Campus Chief/Principal.

4. Final submission

- a. If the dissertation is rejected with major errors either in methodology and data results, resubmission should be done within 3 months of the examination date. In case of minor corrections, the final dissertation should be submitted within one month of the examination date.
- b. After corrections and signing, at least three copies of hard bound final copies along with a soft copy of the dissertation and manuscript of research article in CD either in MS Word or PDF format should be submitted to the respective department/campus/colleges.
- c. From the submitted copies of final dissertation and manuscript article, the respective department should send two copies to the Examination Section of Dean's Office, Institute of Science and Technology, Tribhuvan University along with evaluation marks and one copy of dissertation from the received copies of IOST will be collected by Central Department of Microbiology for dissertation documentation.

Appendix- I: Format of Cover and front pages

(These following pages do not follow margin and pagination format but font size is prescribed)

TITLE OF THE DISSERTATION (16 font size capital)

A Dissertation Submitted to the **Name of the Department / Campus** Tribhuvan
University Kathmandu, Nepal, in Partial Fulfillment of the Requirements for the
Award of Degree of Master of Science in Microbiology
(**Medical/Public Health/Food/Agriculture**) (14 font size)

By

Name of the candidate (14 font size)

T.U. Regd. No.:

Symbol No.:

Year of Submission (12 font size)

© Tribhuvan University (12 font size)

DECLARATION (16 font size)

This dissertation entitled “**Title of the dissertation.....**” has been submitted to the Central Department of Microbiology/Campus/College/ Institute of Science and Technology, Tribhuvan University (T.U.), for the partial fulfilment of the requirements to the degree of Master of Science in Microbiology. This dissertation is conducted under the supervision of **Name of supervisor/co-supervisor**. This is an original report of my own research, has been conducted entirely by myself, and not been submitted for any other degree or professional qualification. I have followed the Tribhuvan University’s current research ethics guidelines, and accept responsibility for the conduct of the procedures in accordance with the University’s rules and regulations.

Signature.....

Name of student:.....

Academic Year:

T.U. Regd. No.:

Symbol No.:.....

Date:

RECOMMENDATION (16 font size caps)

This is to certify that..... Name of the candidate.... has completed this dissertation work entitled.... “**Title of the dissertation**”..... as a partial fulfillment of the requirements of M. Sc. degree in Microbiology (Medical/Public Health/Food/Agriculture.....) under my/our supervision. To my/our knowledge this work has not been submitted for any other degree. (12 font size)

(not less than 10 font size not more than four supervisors)

.....
A Name of Supervisor	B Name of co-Supervisor	C Name of co-Supervisor	D Name of co-Supervisor
Designation	Designation	Designation	Designation
Name of Institution	Name of Institution	Name of Institution	Name of Institution
Address	Address	Address	Address

Date(12 font size)

CERTIFICATE OF APPROVAL (16 font size caps)

(In letter head of the department/campus/college)

On the recommendation of**Name of the supervisor(s)**....., this dissertation work of**Name of the student**.....entitled....."**Title of dissertation**".....has been approved for the examination and is submitted to the Tribhuvan University in partial fulfillment of the requirements for M. Sc. degree in Microbiology (**Medical/Public Health/Food/Agriculture**). (12 font size)

.....

Head of Department/Campus Chief/Coordinator (12 font size)

Name of the Department/Campus

Tribhuvan University Kathmandu,

Nepal

Date:..... (12 font size)

BOARD OF EXAMINATION AND CERTIFICATE OF APPROVAL (16 font caps)

This dissertation entitled “Title of the dissertation....” by **Name of student** (Academic Year:..... Symbol No.:, T.U. Registration No.:) under the supervision of **Name of supervisor** in the **Central Department/Campus/College**, Institute of Science and Technology, Tribhuvan University, is hereby submitted for the partial fulfillment of the Master of Science degree in Microbiology. This dissertation has been examined, approved and recommended for M.Sc. degree in Microbiology.

Recommended by: (12 font)

(Full Name) (12 font)

A Supervisor

Approved by: (12 font)

(Full Name) (12 font)

Head of Department/Campus Chief /Coordinator

Examined by: (12 font)

Internal Examiner (12 font)

Name

External Examiner (12 font)

Name

Date: (12 font)

(Format of Abstract)

Title of the dissertation:

Degree: M.Sc. in Microbiology

Student:

Academic Year:.....Regd. No.:.....Symbol No.:.....

Supervisors:

ABSTRACT

Key words: (minimum three to maximum seven words separated by comma)