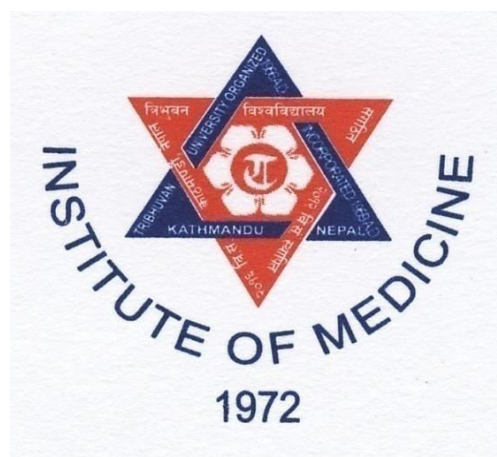


Curriculum
on
Bachelor in Pharmacy
(B. Pharm)



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INSTITUTE OF MEDICINE

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BIO-STATISTICS & RESEARCH METHODOLOGY

Subject: Theory	Year: Third	Code: BP 605 A
Full Marks: 100	Total Teaching hours: 90	Credit hour: 6

Marks distribution for examinations

Subject	Total marks (100)	Internal assessment (20)	Final assessment (80)
Biostatistics	50	10	40
Research Methodology	50	10	40

BIO-STATISTICS [40 Hrs]

Course Description

This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression, Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, SPSS and other Statistical software.

General objectives:

At the end of this course, the student will be able to

- a. Describe the various statistical techniques to solve statistical problems
- b. Perform the operation of different applications and softwares for data analysis.

Specific objectives:

Unit 1: Introduction to Biostatistics:[1 Hrs]

After the completion of the course, students will be able to

Discuss definition, limitations, functions, application in community health, clinical medicine and general health science.

Unit 2: Collection and presentation of Bio-statistical data: [1 Hrs]

After the completion of the course, students will be able to

Discuss collection, classification, tabulation of frequency distribution.

Unit 3: Graphic and Diagrammatic representation: [1 Hrs]

After the completion of the course, students will be to

Discuss diagrammatic and graphic representation of data.

Unit 4: Measures of central tendency:[1 Hrs]

After the completion of the course, students will be able to

Explain Mean, Mode, n and their properties, partition values (Quartiles, Deciles, and Percentile).

Unit 5: Measures of dispersion: [2 Hrs]

After the completion of the course, students will be able to Explain Range, QD, Mean deviation from Mean, Mode, n, Standard deviation, coefficient of variation and their properties.

Unit 6: Concept of Sampling: [3 Hrs]

After the completion of the course, students will be able to Explain Sample surveys, sampling techniques and determination of sample size.

Unit 7: Probability [4 Hrs]

After the completion of the course, students will be able to Discuss definition of Probability, laws of probability (addition and multiplication); Probability distribution (Binomial, Poisson and Normal distribution).

Unit 8: Test of significances (Non-parametric data) [7 Hrs]

After the completion of the course, students will be able to Discuss Chi-square test, Wilcoxon sign rank test, Mann Whitney U test, Kruskal-Wallis test.

Unit 9: Test of significances (Parametric data) [6 Hrs]

After the completion of the course, students will be able to Discuss Z-test, t-test, F-test, ANOVA.

Unit 10: Correlation and regression analysis [5 Hrs]

After the completion of the course, students will be able to

- a Explain Correlation analysis, simple correlation coefficient calculation.
- b Discuss difference between Correlation and Regression.
- c Discuss Regression equations and uses of regression analysis.
- d Discuss Logistic regression (binary & multinomial).

Unit 11: Applied statistical techniques [9 Hrs]

After the completion of the course, students will be able to

- a Explain experimental design in clinical trials
- b Discuss statistical quality control.
- c Discuss Statistical approaches for establishing bioequivalence.

Reference books [Latest Editions]

1. Mahajan B. K. Methods in biostatistics. Jaypee Brothers Publishers; 2002.
2. Duncan R. C, Knapp R. G, Miller M. C. Introductory biostatistics for the health sciences. New York: Wiley.
3. Rao S, Richard J. Introduction to bio-statistics andresearch method.
4. Basic and Clinical Biostatistics, Lange Publishers
5. Jones D. S. Pharmaceutical statistics.
6. Bancroft H. Introduction to biostatistics. A Hoeber-Harper Book.
7. Geller N. L. Advances in clinical trial biostatistics. CRC Press.

RESEARCH METHODOLOGY [50 HRS]

Course Description: Research methodology is aimed at developing research proposals and thesis reports.

General objectives:

At the end of this course, the student will be able to

- a. Explain the value, scope, objective and requirements of research
- b. Develop skills necessary for research proposal development
- c. Develop report paper writing/ thesis writing skills.
- d. Outline the basic principles of medical research
- h. Critically appraise scientific articles and assess the quality
- i. Develop a report on the critically appraised article
- j. Present the critically appraised article in appropriate forum

Specific objectives:

1. Introduction to Research Methodology 4 Hrs]

After the completion of the course, students will be able to

- a Discuss meaning & Objectives of research, types of research, research process
- b Discuss criteria for good research
- c Explain qualitative, quantitative and mixed research methods. [

2. Selection of Research Topic [4 Hrs]

After the completion of the course, students will be able to

- a Explain problem Identification & Formulation
- b Discuss Research question,
- c Discuss Research hypothesis
- d Discuss Research objectives
- e Discuss Literature review
- f Explain evaluation of research problem.

3. Research Design [8 Hrs]

After the completion of the course, students will be able to

- a Discuss features of a good research design.
- b Explain concept, types and uses of Exploratory Research Design
- c Explain concept, types and uses of Descriptive Research Designs
- d Explain concept, types and uses of Experimental Research Design
- e Explain concept of Meta analysis and Systematic reviews

4. Methods & tools of research [5 Hrs]

After the completion of the course, students will be able to

- a Discuss Reliability and Validity of research tool.
- b Discuss Diagnostic accuracy testing.

- c Discuss Primary & secondary data collection method,
- d Prepare questionnaire and opinionnaire, organization of data collection, processing & analyzing of data & information.

5. Preparing a research proposal [3 Hrs]

After the completion of the course, students will be able to

- a Explain format of research proposals: finding related literature,
- b Develop Individual & Institutional research proposals
- c Discuss submitting research proposal to funding agencies.

6. Interpretation of Data and Paper Writing [8 Hrs]

After the completion of the course, students will be able to

- a Describe layout of a Research Paper
- b Discuss Impact factor of Journals
- c Discuss When and where to publish?
- d Discuss Ethical issues related to publishing, Plagiarism and Self-Plagiarism.
- e Explain Research database: HINARI, PubMed, MEDLINE, Web of science, Science direct, Cochrane library.
- f Explain guidelines for scientific reporting: CONSORT, PRISMA, STROBE.

7. Use of tools / techniques for Research [8 Hrs]

After the completion of the course, students will be able to

- a Explain methods to search required information effectively
- b Discuss Reference Management Software like Endnote/Zotero/Mendeley
- c Discuss Software for paper formatting like LaTeX/MS Office
- d Discuss Software for detection of Plagiarism like Turnitin. Data analysis by SPSS. Optimization experiments using Design expert/Minitab.

8. The Research Report writing [5 Hrs]

After the completion of the course, students will be able to

- a Explain Style manuals, format of research report, The thesis or dissertation, style of writing, typing the report, reference form, pagination, tables, figures, evaluating a research report, summary, references.
- b Discuss requirements for poster presentations.
- c Conduct Journal club presentations.

9. Ethics in Clinical Research [5 Hrs]

After the completion of the course, students will be able to

Discuss Nuremberg Code, Thalidomide study, Nazis Trials, Tuskegee Syphilis Study, The Belmont Report, The declaration of Helsinki. GCP, CDSCO and ICMR guidelines for biomedical research.

Note: At the end of the course, students must develop a research proposal (Pharmaceutical sector only) and compulsorily submit to the department for conducting Dissertation in fourth year. This

will be the prerequisite for passing internal assessment of Bio-Statistics & Research Methodology.

Reference books

1. Kumar R. Research methodology: A step-by-step guide for beginners. SAGE Publications Inc.
2. Singh YK. Fundamentals of Research Methodology and Statistics. New Age International (p) Limited.
3. Kothari CK. Research Methodology: Methods and Techniques. New Age International (p) Limited.
4. Flick U. Introducing Research Methodology: A Beginner's Guide to Doing a Research Project. SAGE Publications.
5. Chaudhary K. P. R. A Textbook of Research Methodology & Biostatistics for Pharmacy Students. PharmaMed Press/ BSP Books.
6. Aparasu R. R. Research Methods for Pharmaceutical Practice and Policy. Pharmaceutical Press. Lambeth High Street, London
7. Cochrane library search