

M.Sc.,(EPIDEMIOLOGY) - SYLLABUS

PAPER I – PRINCIPLES OF EPIDEMIOLOGY AND BIostatISTICS

I. 1. FUNDAMENTALS OF EPIDEMIOLOGY

- Tools of Epidemiology: measuring disease Frequency (Prevalence, incidence, morbidity rates, attack rates etc.
- Historical aspects of Epidemiology and evolution
- Definition and understanding - Natural history of disease
- Survey methodology including census procedures and Sampling

2. PRINCIPLES OF MEASUREMENTS:-

- Types of measures
- Reliability
- Validity
- Accuracy
- Questionnaire construction
- Index construction and scaling
- Observe variation
- Diagnostic tests
- Measurement issues
- Evaluating sources of data.

3. STUDY DESIGNS:-

a) Observational Studies

- Cross Sectional Studies
- Descriptive Studies
- Cohort Studies
- Case Control Studies
- Before – after Studies
- Historical Prospective Studies
- Making international comparisons

b) Experimental Studies

- The Randomized Control trial
- Allocation alternative
- Maneuver
- Measurement including blinding
- Compliance, contamination, co intervention
- Adverse events

- Stopping rules
- Analysis
- Diagnostic tests
- Measurement issues

c) qualitative research

- Mixed designs
- Ecological Studies
- Space time cluster studies
- Familial aggregation studies

4. **FUNDAMENTAL OF RESEARCH METHODOLOGY**

- The measurement loop and the Critical Appraisal cube
- Defining the question/posing the problem
- Selecting the study design
- Sample selection
- Sample size
- Events, outcome measures, dropouts
- Analysis and reporting
- Ethics

II. BIO-STATISTICS

(i) Introduction to Biostatistics

Definition – Collection and Classification of Data – Diagrammatic and Graphical Representation of data – Types of Variables – Scales of Measurement.

(ii) Measures of central tendency and dispersion

- mean, mode and median- variance standard deviation & co-efficient of variation, H-Spread.

(iii) Probability Theory

(iv) Probability Sampling

- Sampling

Techniques

- (v) Probability Distribution**
 - Binomial, Poisson, Normal- Standard normal curve
- (vi) Estimation of population parameter from sample**
 - standard error- confidence interval
- (vii) Direct and indirect standardization**
- (viii) Sample size calculation**
 - for estimation & for comparison
- (ix) Tests of significance**
 - Parametric (t-test, test of proportion, test for difference of means)
 - Non parametric (Mann – Whitney, Wilcoxon's, Kruskal Wallis Chi-square)
- (x) Analysis of variance**
 - One way ANOVA- Two way ANOVA
- (xi) Correlation and Regression**
- (xii) Generalized linear models**
 - linear, loglinear and logistic models
- (xiii) Survival Analysis**
 - Life table (construction and uses)
- (xiv) Times Series Analysis**

PAPER II – EPIDEMIOLOGY OF DISEASES OF PUBLIC HEALTH
IMPORTANCE AND DISEASE CONTROL

1. Epidemiological aspects of diseases of national importance

- ARI
- Diarrhea
- Vaccine preventable disease
- Tuberculosis
- Visual impairment/blindness
- Malaria
- Filariasis
- HIV
- STD
- Coronary Heart disease
- Malignancy
- Diabetes mellitus
- Injuries
- Internal
- Leprosy
- Hypertension
- Mental Health

2. Infectious disease Epidemiology.

3. Chronic disease Epidemiology

4. Epidemiological aspects of diseases - Non-Communicable

5. Emerging and Re- Emerging Diseases

6. National Programmes related to Communicable and Non Communicable diseases

7. Dengue, Swine Flu, Chikungunya

PAPER –III EPIDEMIOLOGICAL METHODS IN HEALTH MANAGEMENT

1. National health programmes
 - Nutritional Disorders related National Health Programmes
 - MCH and Demographic related National Health Programmes
 - Advocacy
2. Monitoring and evaluation health programmes
3. Roles of Genetic and Environmental Factors in Disease Causation

4. Health Economics
 - Principles of Health Economics - Cost benefit, cost Effectiveness and cost utility including costing.
 - Efficacy effectiveness and efficiency
 - Evaluation needs and methods
 - Public health laboratory utilization of services

i. DEMOGRAPHY

1. Age sex distribution of population
 - Population pyramid
 - Sex ratio, dependency ratio
 - Factors affecting demographic profile (fertility, mortality and migration)

2. Measures of fertility
 - Crude birth rate, child woman ration, general Fertility rate, age specific fertility rate, total Fertility rate, gross reproduction rate, net Reproduction rate

 - Preparation of Educational materials
 - The role of the tutor on small group tutorials
 - Small group tutorials and group dynamics
 - Workshop organisation
 - Principles of learning

3. Factors affecting fertility

4. Measures of mortality
 - Crude death rate
 - Age specific death rate
 - SMR

5. Sources of demographic data

- Registration of vital events
- Sample surveys
- Census

6. Demographic transition

- Rate of natural increase
- Malthusian theory
- Doubling time & projections

ii) **ENVIRONMENTAL HEALTH**

- Environmental factors that can affect health
 - Physical
 - Chemical
 - Biological
- Measurement of exposure to physical and chemical agents
- Prevention of environmental pollution
- Injury control in working environment
- Epidemiology of road traffic accidents

iii) **BEHAVIORAL SCIENCES**

- Formation and structure of a society
- Cultural practices and the effect on health and illness behavior
- Life styles and the effect on health
- Communication
 - Methods
 - Barriers
 - Health education
- Effect of social changes on health states

Decision Analysis

- Decision tree
- Test Strategies
- Multiple tests
- Sensitivity analysis

SYLLABUS

Epidemiology, Biostatistics and Medical Ethics

UNIT I: Epidemiology

Introduction: Historical aspects and evolution of epidemiology, definitions and concepts in Epidemiology.

Approaches in epidemiology: Descriptive and analytical epidemiology, disease burden, natural history of diseases and measures of risk and death.

Study design and sampling: Sample size estimation and introduction to study design in epidemiological investigations.

UNIT II: Biostatistics

Fundamentals of biostatistics: Introduction, types of data, tabular and graphical presentation of data. Measures of location, dispersion and correlation: Measures of central tendency. Mean, mode, median, GM, HM, quartiles Measures of dispersion—range, standard deviation, variance, coefficient of variation.

Probability and statistical inference: Concept and probability distribution. Normal distribution— density curves, applications and statistical tables. Concept of significance tests, parametric and nonparametric tests, standard error and confidence intervals.

Inferential statistics: Probability and distributions – Poisson, Binomial and Normal distribution – Chi-square test – Hypothesis test - Student's t-test – Correlation and Regression – ANOVA.

UNIT III: Medical Ethics

Bioethics and Medical ethics: Historical perspectives & Introduction to Bioethics, Nuremberg Code, Declaration of Helsinki, Principle of essentiality, informed consent, confidentiality, minimisation of risk, accountability and responsibility. Ethics of clinical trials: Drug trials, vaccine trials, Clinical trials with medical devices/surgical procedures/radioactive materials, Research in transplantation and stem cell therapy. Regulatory framework and guidelines for conduction of human research: Review processes, Institutional ethical committees, composition of committees, review procedures, WHO, UNESCO and ICMR guidelines.

References :

J. Epidemiology: An Introduction. Kenneth J. J. Rothman. Latest edition / Pub. Date: May 2002. Publisher: Oxford University Press.

K. Epidemiology. Leon Gordis. Latest edition / Pub. Date: November 2004. Publisher: Elsevier Health Sciences.

L. Diseases and Human Evolution. Ethne Barnes. Latest edition / Latest edition / Pub. Date: March 2005. Publisher: University of New Mexico Press.

4. Epidemiology: Beyond the Basics. F. Javier Nieto, Moyses Szklo. Latest edition / Pub. Date: November 2003. Publisher: Jones & Bartlett Publishers, Inc.
5. Basic and Clinical Biostatistics. Beth Dawson, Robert G. Trapp, Robert Trapp. Latest edition / Pub. Date: March 2004.
6. Discovering Statistics Using SPSS. Andy Field. Latest edition / Pub. Date: April 2005. Publisher: SAGE Publications.
7. Arora PN & Malhon PK (1996). Biostatistics Imalaya Publishing House, Mumbai.
- 2 Sokal & Rohif (1973). Introduction to Biostatistics, Toppan Co. Japan.
- 3 Stanton A & Clantz, Primer of Biostatistics — The McGraw Hill Inc., New York.
10. Government of India. Good Clinical Practices for Clinical Research in India. New Delhi: 2001
5. Indian Council of Medical Research. Ethical Guidelines for Biomedical Research on Human Subjects. New Delhi: 2000
12. United Nations Educational, Scientific and Cultural Organisation (UNESCO). Universal Declaration on Bioethics and Human Rights. Paris; 2005
