UNIVERSITY OF LUCKNOW

PG DIPLOMA COURSE IN EPIDEMIOLOGY AND BIOSTATISTICS

PROGRAMME BROCHURE

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CONTENTS

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The human health history has many instances of pandemic caused by bacterium or virus, capable of spreading widely and rapidly. The most notable pandemics that effected human civilization include the Black Death (a plague outbreak from the 14th century), the Spanish Flu of 1918, the most recent outbreaks in the 21st century, including SARS (2003), H1N1 (2009), MERS (2012), Ebola (2014), Zika (2015) and SARS-CoV-2 (2019). At present we are facing the biggest crisis of our generation in the form of COVID-19 Pandemic.

The current COVID-19 Pandemic has brought the entire world to a standstill, leaving little room for emphasizing that a robust Health System of a country needs both a strong Public Health System (to prevent outbreaks/epidemics and its transmission) as well an equally strong Healthcare system (to treat and cure the ailing population). **It's a live lesson in Public Health.** The current pandemic has badly exposed the developed nations having both strong Public Health as well as Healthcare Systems and regarded as best by the international community. The decisions taken by the government and people in this state of global crisis will probably shape not only our healthcare systems but also our economics, politics and culture.

With the rapid evolution of viral and other pathogenic genomes, together with a lifestyle having a toll on the human immune systems, such outbreaks are predicted to rise in frequency and severity in the coming times. Globalization has led to an increase in the speed of spread of many such outbreaks, that started as local outbreaks but within a span of a fortnight transformed into major epidemics or pandemics. Thus, professionals capable of translating problems into solutions, based on the evidence gained from epidemiologic and biostatistical approaches to the -study of such problems, are a need of the hour. Today, an entire spectrum of sectors needed to run a nation; ranging from health care, pharmaceuticals, governmental and non-governmental agencies and business to academia, need a workforce trained in research on the real world health and social problems and applying that knowledge to come up with evidence-based solutions in daily life.

COVID-19 Pandemic necessitates the academic institutions to include the management of communicable disease into its main syllabi and therefore we have initiated a Post-Graduate Diploma Course in Epidemiology and Biostatistics. This diploma course is recommended for professionals in health services, research units, or academic departments who want to improve global health. Taking this course will prepare students to apply epidemiological research methods to global health issues.

Programme Description

PG Diploma in Epidemiology and Biostatistics:
Diploma Course in Epidemiology and Biostatistics is a post graduate level, interdisciplinary program designed to provide research-oriented training in the theory and tools of Epidemiology and Biostatistics, the foundational disciplines of public health, to working professionals coming from a variety of backgrounds, including physicians, nurses, public health administrators, health educators, clinical research professionals, policy experts and more. In this Course, students will

learn about basic epidemiology principles, concepts and procedures in biostatistics, and how to put them into practice in the real world for the surveillance or investigation of the health-related states or events. Students will also learn techniques for describing, summarizing and analyzing data, assessing associations among variables, and determining the extent to which chance may or may not be influencing the events in question.

Students learn the principles of epidemiology and biostatistics and gain skills in using epidemiologic and Biostatistical tools to describe, monitor, and investigate the drivers of health of the general population.

Aims and Objectives

The course aims to develop:

- A comprehensive understanding of the key features of descriptive and analytic epidemiology.
- Essential skills to calculate measures of risk in a population and accurately and efficiently summarize and display public health data to be used for policymaking.
- An ability to apply principles of public health surveillance and outbreak investigation so as to prevent large scale transmission of an outbreak.

Course Objectives:

The course will help the candidate to develop skills in the following areas:

1. Problem solving and critical thinking and coming up with innovative ideas to influence public health programmes.
2. Ability for operational research in institutional and field settings.
3. An understanding of the epidemiological transitions of programmes in order to prioritize public health challenges for policymaking.
4. A capacity to formulate context appropriate policies and design programmes to address public health challenges, effectively.

Course Specific Outcomes:

The successful completion of the course will enable the students to:

1. Apply the Course learning to the public health system and its challenges.
2. Critically conduct the situational analysis and develop action plan for identified public health issues.
3. Develop, implement and evaluate key public health policies.
4. Understand roles of supply and demand in policymaking in healthcare.
5. Develop and demonstrate competency in managing health systems at different levels.
6. Disseminate knowledge in the form of scientific writings for the global benefit of mankind.
7. Prioritize health issues in population.
8. Develop competency in research.
9. Develop competence to critically evaluate existing information and identify gaps.
10. Have more career opportunities to choose from, and with a higher salary.

Course Duration

The duration of the programme is one academic year, and shall be divided into two semesters for the examination purposes, called as First semester and Second semester. The maximum period for completion of the programme is two years including the year of admission, subject to payment of Continuation Fee.

Intake: 30 students.

Admission Procedure
Admission to the course shall be made on the basis of academic record at the graduation level and on payment of the required registration/admission fees.

Academic Requirements

a. Bachelor's degree in Medical/ Biomedical/ Pharma/ Biotechnology/ Microbiology/ Science/ Engineering from any recognized University.
b. Candidates appearing for the final year of Bachelor's degree/equivalent qualification exam or awaiting their results are also eligible to apply.
c. This course is truly professional; hence individuals employed in any sector (production, processing, quality, trial, R&D etc.) in the healthcare industry can also seek benefits.

Note: Admissions shall be made strictly in order of merit which may be based on the academic record of the candidate/any other criteria as per the decision of the University of Lucknow.

Course Structure/ Modules

Course Credit Scheme

Semester	**Core Course**			**Open Elective Course**			**Credit/ Non Credit Value added Courses**			**Total Credits**
	No. of Papers	Credits (T+L)	**Total Credits**	No. of Paper	Credit (T)	Total Credit	No. of Paper	Credit (T)	Total Credit	
I	4	22T+6L	**28**	-	-	-	-	-	-	**28**
II	3	20T	**20**	-	-	-	-	-	-	**20**
Total Course Credits										**48**

- The course is completed in two semesters, total course credit is 48 (1200 marks).
- Semester I of 28 credits (700 marks) and semester II of 20 credits (500 marks).
- Semester I has 4 modules, out of which first 2 are of 8 credits each and other two are of 6 credits each.
- Semester II has 3 modules, wherein first 2 are of 6 credits each and the last one is of 8 credits.
- A student must study all the modules to earn 48 credits for the completion of the course and award of PG Diploma.

Semester Details of PG Diploma Course in Epidemiology and Biostatistics

Summary				
Semester	**Code**	**Modules**	**Credits**	**Total Credits**
I	DEB101	Epidemiology and Clinical Trials	8	**28**
	DEB102	Biostatistics	8	
	DEB103	Public Health Law and Ethics	6	
	DEB104	Introduction to Public Health Laboratory	6	
II	DEB201	Health Economics and Finance	6	**20**
	DEB202	Health Policy and Management	6	
	DEB203	Scientific Writing and Case Studies	8	

Conduct of the Programme

Online support: The candidates will get the services of online support throughout the year and will have access to the soft copy of the reading materials, presentation slides, video lectures on the course modules. Beside these, MCQ quizzes, self-assessment assignments and project work details would be provided by the University from time to time. The website will be the main delivery system in terms of updating information on the subject. The access to the website will be deactivated after the completion of the course duration and will be revived on continuation of the course after payment of the Continuation fee.

Offline support: The classes in the University New Campus will be held regularly as per the time table.

Course Fee Structure

Total fees for full programme of one year or 2 semesters is INR 44,000/-.

Fee structure details:

S. No.	Fee heads	Semester I	Semester II
1.	Enrollment Fee	1000*	
2.	Admission Fee	1000*	
3.	Caution money[#]	2000*	
4.	Establishment Fee	3000	3000
5.	Development Fee	5000	5000
6.	Tuition Fee	8000	8000
7.	Examination Fee	4000	4000
TOTAL		**24,000/-**	**20,000/-**

*** Fees to be paid one time at the time of admission**

[#] Refundable Fee

Application Deadline: xxxxx

Registration

i. A candidate will be able to register for the course by visiting the link for registration available on official website of University of Lucknow. A valid User ID and Password will

be sent to the candidate's registered mobile number and the email, which shall be used for further process.

ii. Subsequent to registration, candidates will be required to upload the requisite documents, as may be asked by the University.

iii. After the documents are uploaded, students will be required to deposit the course fee through prescribed online modes.

Examination and Certification

1. University of Lucknow follows a credit system based learning activities for all PG programmes. To successfully complete the programme, one has to earn all the credits assigned to the programme.
2. All the participants are expected to appear for examination and are also obliged to submit assignments as per requisite.
3. There shall be an examination at the end of each semester. Every student registered in any of the two semesters, shall be eligible to appear in the concerned examination of the respective semester.
4. After successful completion, the participants will be awarded Post Graduate Diploma in Epidemiology and Biostatistics by University of Lucknow, Lucknow.

Evaluation Scheme

Assessment (assignments, tests, quizzes, etc.) – 60%
Scientific Writing (concept paper for research projects, clinical case report, etc.) – 30%
Presentation – 10%
Total – 100%

For Semester I, Paper IV: **DEB104: Introduction to Public Health Laboratory**: the individuals other than the in-service candidates have to do a 4 weeks Internship in the hospital/ research lab and finally submit PPT (Power Point Presentation) or You Tube Lecture presentation/recorded video explaining the work.

Award of grades

The performance of the students would be evaluated on with corresponding grades as mentioned below:

Percentage of Marks	**Grade**
80 and above	A
70-79	B
60-69	C
50-59	D
Below 50	F (Fail)

In case a candidate obtains fractional marks, the fraction will be rounded off to the nearest whole number. In order to be successful in a paper, a candidate shall be required to obtain 50% marks in each module. Once a candidate attempts a paper and is declared as 'Failed (F)', his/her grade shall carry 'R' (for repeat) with the grade obtained later.

Award of the PG Diploma (Online Mode)

A candidate shall be declared to have passed the diploma course and become eligible for the award of the PG Diploma, if he/she secures 50% or above marks in each module and an overall percentage of 50%. However, a candidate failing in any of the module/s can seek re-examination in the respective module in the subsequent exam by paying the prescribed Continuation Fee and examination fees, as applicable.

Refund of Fee in case of Withdrawal of admission

In case of withdrawal of admission before or after the commencement of the session, refund shall be made as per University Norms.

Semester I

SEMESTER – I

DEB-101: EPIDEMIOLOGY AND CLINICAL TRIALS (Total Credits: 08)

Course Description: This course in Basic Epidemiology aims to provide a comprehensive introduction to epidemiologic concepts and methods. It includes definition of field epidemiology, basic principles, concepts of disease occurrence, and operational aspects of epidemiological field investigations. Students are exposed to different study designs and measures of association often used in analyzing results from these studies. They develop an understanding of analysis and interpretation of clinical data, ability to carry out research projects on clinical and epidemiological aspects. They will also learn to work on current databases, automated data retrieval systems, referencing and skill in writing scientific papers. It teaches the principles and practice of clinical epidemiology, drawing on real problems faced by medical professionals and elaborating on existing examples of clinical research. Medical researchers will lean how to translate real clinical problems into tangible research questions for investigation, gaining insight into some of the most important considerations when designing an epidemiological study along the way.

Skills: Students attain knowledge of research principles and methods applicable to the field. They can plan and execute research activities for solving a biomedical question or problem, if applicable from a social perspective. The course helps in achieving communication; speaking and writing skills, critical thinking skills, statistical skills and teaching skills so that one can organize community outreach activities to educate the public about health risks and healthy living.

Unit-1: The Epidemiologic Approach

- Definition and Historical Evolution of Epidemiology
- Uses of Epidemiology and Core Epidemiologic Functions
- Descriptive and Analytic Epidemiology
- Concepts of Disease Occurrence and Spectrum of Disease

Unit-2: Measures of Risk and Public Health Surveillance

- Frequency – Morbidity and Mortality Measures
- Measures of Natality (Birth) and Association
- Introduction and Characteristics of Public Health Surveillance
- Identifying Problems and Collecting Data for Surveillance

Unit-3: Investigating an Outbreak (Special Reference to COVID-19)

- Introduction to Investigating an Outbreak
- Steps of an Outbreak Investigation
- Response to an Outbreak
- Public Health Measures in an Outbreak

Unit-4: Clinical Trials and Case Studies

- Introduction to Clinical Trials
- Data Collection in Clinical Research
- Data Monitoring in Clinical Trials

- Case Studies in Clinical Trials

Unit-5: Clinical Epidemiology

- Introduction to Clinical Epidemiology
- Frequency, Abnormality and Basic Principles of Risk
- Prognosis and Diagnosis
- Treatment and Prevention

Suggested Readings

1. Gordis Leon – Epidemiology
2. Beaglehole R et al - Basic Epidemiology
3. David E et al - Foundations of Epidemiology
4. Robert H Friis - Epidemiology for Public Health Practice
5. Silman and McFarland - Epidemiological Studies: A Practical Guide
6. Curtis L Meinert – Clinical Trials
7. Diederick E Grobbee and Arno W Hoes – Clinical Epidemiology
8. Robert Fletcher and Suzanne W Fletcher – Clinical Epidemiology
9. Freidman LM, Furberg CD, DeMets David – Fundamentals of Clinical Trials
10. Daniel Siegel – Clinical Trials, Epidemiology, and Public Confidence

SEMESTER – I

DEB-102: BIOSTATISTICS (Total Credits: 08)

Course Description: The course provides a theoretical overview and practical applications of descriptive and bivariate statistical analyses. Topics include introduction to Biostatistics, role of Biostatistics, types of variables, types of data, scales of measurement; diagrammatic representation of data- Bar plot, pie chart, and histogram; measures of central tendency, measures of dispersion, Skewness, Kurtosis, correlation and regression. Students are introduced to different statistical software for maintaining datasets and executing analyses. Formulate statistical models for real datasets arising in various fields to analyse various useful characteristics of populations. Learn techniques in survey sampling with practical applications which would be beneficial in further study/research. Students develop an understanding of estimation and testing of hypothesis procedures. Topics include: Estimator and estimation, importance of estimation, properties of good estimator, type I and type II error, testing of hypothesis, t-tests, analysis of variance, chi-square test.

Skills: Practice analyzing sample datasets, with specific emphasis on identifying the appropriate test, design, appropriate distribution and sampling scheme to use and implementing the test in R and/or Excel.

Unit-1: Biostatistics – Summarizing Data

- Scope and Role of Biostatistics in Public Health
- Data, Information, and Health Information Systems
- Types of Variables, Frequency Distributions and Properties
- Methods for Summarising Data and Scales of Measurement
- Measures of Central Location

Unit-2: Measures of Spread and Correlation & Regression

- Measures of Dispersion
- Measures of Skewness and Kurtosis
- Correlation Coefficient
- Simple and Multiple Linear Regression
- Measures of Significance

Unit-3: Probability and Distributions

- Concepts and Definitions of Probability
- Conditional Probability and Independence
- Random variables: Discrete and continuous
- Probability mass and probability density functions
- Discrete and Continuous distributions

Unit-4: Sampling and Statistical Inference

- Complete enumeration vs. sample surveys
- Methods of drawing a random sample and Sampling designs

- Comparisons of various sampling designs
- Probability and Non-probability sampling
- Sampling distributions
- Methods of Estimation: Point and Interval
- Testing of hypothesis: Parametric and Non- Parametric

Unit-5: Biostatistical Analysis - COVID-19 Case Study

- Extraction of Data on Lab-Confirmed COVID-19 Cases
- Susceptible-Exposed-Infectious-Recovered Model
- Impact of Public Health Interventions
- Impact of Clinical Interventions on COVID-19

Suggested Readings

1. Agresti, A (2002). Categorical Data Analysis, Wiley Series in Probability and Statistics.
2. Cochran, W.G. (2007). Sampling Techniques, Wiley.
3. Daniel, D. W. and Cross, C. L. (2004). Biostatistics: Basic Concepts and Methodology for the Health Sciences, Wiley.
4. Everitt, B. S. and Hothorn, T (2006). A Handbook of Statistical Analyses Using R, Chapman and Hall.
5. Gerstman, B.B. (2014): Basic Biostatistics, 2nd Ed.
6. Gun, A.M., Gupta, M.K. and Dasgupta B. (2016). Fundamentals of Statistics-Vol I, World Press.
7. Gun, A.M., Gupta, M.K. and Dasgupta B. (2016). Fundamentals of Statistics-Vol II, World Press.
8. Logan, M. (2011). Biostatistical Design and Analysis Using R: A Practical Guide, Wiley-Blackwell.

SEMESTER – I

DEB-103: PUBLIC HEALTH LAW AND ETHICS (Total Credits: 06)

Course Description: This course is designed to introduce students to the principles and best practices for conducting human research. The history of research ethics and concepts, such as vulnerable populations, risk, and equipoise, are introduced. Students complete online certification for internationally recognized training in human research ethics by the end of the course. Students receive information about national ethics review boards and requirements for proposal submissions.

Skills: Identifying components of a study that may require special ethical considerations and proposing measures to reduce risk to participants.

Unit-1: Key Concepts of Law in Public Health Practice

- Introduction and Scope of Public Health Law
- Historical Perspective of Law in Public Health
- Constitutional Design of Public Health Law
- Public Health Law – Essential Indicators

Unit-2: Ethics and the Law in Public Health

- Definitions and Concepts of Law and Ethics
- Need for Public Health Ethics
- Ethical Decision Making
- Incorporating a Code of Ethics in day-to-day Activities

Unit-3: Administrative Law and Public Health

- International Public Health Instruments
- Public Health Is a State Subject
- Preservation of Public Health Through Enforcement
- Existing Public Health Legislations

Unit-4: Ethics Committees in India

- Ethics Committees and Clinical Research
- Declaration of Helsinki, 1975, and GCP, 2001
- Ethics Committee Constitution and Functioning
- Ethical Review Process

Unit-5: Public Health Ethics - COVID-19

- Emergency Powers and Pandemic Ethics
- Beyond Liberty – One Value Amongst Others
- Public Health, Social Ethics and Government
- Preparation and Governance as per the Situation

Suggested Readings

1. Melnick, Bonnie, Bernheim, Childress – Essentials of Public Health Ethics
2. Lawrence O Gostin and Lindsay F Wiley – Public Health Law and Ethics
3. Bayer R, Gostin LO, Jennings B, Steinbock B - Public Health Ethics
4. Jonathan Mann - Health and Human Rights: A Reader
5. Micahel Grodin - Health and Human Rights in a Changing World
6. Milbank Memorial Fund – Public Health Law and Ethics
7. Larry Gostin – Public Health Law
8. Bonnie Steinbock and Ronald Bayer – Public Health Ethics
9. Bonnie Steinbock and Dan E Beauchamp – New Ethics for the Public's Health
10. Ortmann LW et al – Public Health Ethics

SEMESTER – I

DEB-104: INTRODUCTION TO PUBLIC HEALTH LABORATORY (Total Credits: 06)

Course Description: The Public Health Lab course is largely theoretical and focuses on diseases and health status of population groups and sampling and handling biological specimens to avoid contamination. The course guides the student in performing limited diagnostic tests, reference tests, and disease surveillance through demonstration.

Skills: Communicating laboratory procedures for the diagnosis of diseases under surveillance, interpreting diagnostic test results.

Unit-1: Introduction to Public Health Laboratories

- Introduction to Public Health Laboratories (PHLs)
- Clinical Diagnostic Testing
- Testing Samples in a Disease Outbreak
- Advanced Skills in Laboratory Practice

Unit-2: Functions of Public Health Laboratories

- Public Health Preparedness
- Disease Prevention, Control and Surveillance
- Integrated Data Management
- Reference and Specialised Testing

Unit-3: Public Health Laboratory Infrastructures

- Environmental Laboratories
- Local Departments and PHLs
- State PHLs
- Union PHLs

Unit-4: Laboratory Safety

- Laboratory Safety Overview
- Laboratory Biosafety Levels
- Laboratory Safety Governance
- Laboratory Safety Considerations

Unit-5: Using Results to Affect Public Health

- Monitor Trends and Detect Changes
- Identify or Confirm an Outbreak
- Provide Guidance and Immediate Action
- Guide Public Policy

Suggested Readings

1. Becker et al – An Introduction to Public Health Laboratories
2. Association of Public Health Laboratories (APHL) – About Public Health Labs
3. Becker et al - Public Health Laboratory Administration
4. Witt-Kushner et al – Core Functions and Capabilities of State Public Health Lab
5. World Health Organization - Health Laboratory Strengthening
6. World Health Organization – Biosafety and Laboratory Biosecurity
7. World Health Organization – Laboratory Twinning Initiative
8. Medical Laboratory Observer – A Healthier World through Quality Lab Practice
9. APHL – Requirements for Public Health Lab Information Management System

Semester II

SEMESTER – II

DEB-201: HEALTH ECONOMICS AND FINANCE (Total Credits: 06)

Course Description: This course is designed to provide the student with the knowledge and tools used to express the financial and economic components of the healthcare industry. Students are introduced to key conceptual frameworks and principles of health care economics. They review how Indian and international health care systems are financed and funded, as well as core theories of supply and demand in health care, including the importance of information (and information asymmetry), the critical role of insurance, hospital financing and delivery, long-term care organization, pay-for-performance schemes, and private/public mix in finance and provision of health care. Students will develop a vocabulary in addition to gaining knowledge in the use of graphs, charts, tables and reports. The student will utilize these tools to assess past and present analysis as well as projecting future developments.

Skills: Presenting economic data in graph and chart form, communicating key economics and finance concepts in the context of healthcare systems.

Unit-1: Introduction – Relevance of Economics in Healthcare

- Introduction to Health Economics
- Relevance of Health Economics
- Economic Methods and Examples of Analysis
- Notable Contributors to Health Economics

Unit-2: Health Care Markets

- Introduction to Developing and Developed Countries
- Healthcare Markets - Economist Perspective
- Demand for Healthcare, Health Insurance
- Healthcare Professionals, Hospital Services

Unit-3: Micro and Macro Approach in Health

- Micro and Macro Economics in Health
- National Income Accounts: GNP, GDP, NNP and Inflation
- Real Vs. Nominal Price
- Health Care Spending

Unit-4: Economic Evaluation of Health

- Health Care Cost Concept
- Capital, Recurrent, and Opportunity Cost
- Direct and Indirect Cost
- Fixed and Variable Cost

Unit-5: Health Care Finance

- Overview of Health Care Finance
- Record Financial Operations

- Analyse and Understand Financial Operations
- Report and Measure Financial Results

Suggested Readings

1. Sherry Glied and Peter C Smitt – The Oxford Handbook of Health Economics
2. Panly MV, Mequire TG, Pedro P Barros – Handbook of Health Economics
3. Diane M Dewar - Essentials of Health Economics
4. D Amutha - A Text Book of Health Economics
5. PC Das - Health Economics
6. Penner S – Introduction to Healthcare Economics and Financial Management
7. Jones Andrew M – Applied Health Economics
8. Musgrove Philip – Health Economics in Development
9. Jakovljevic M and Ogura S – Health Economics at the Crossroads of Centuries

DEB-202: HEALTH POLICY AND MANAGEMENT (Total Credits: 06)

Course Description: This course will cover the organizational structure and function of public health systems, policies, and programs at the district, county and national levels. Official agencies, voluntary agencies, and health-related activities in the private sector are considered. Topics covered in this course include health services/ public health organizations/programs, financing, workforce, costs & quality issues, and organizational management. This course will provide an overall picture as well as many specific elements of health services/ public health organizations in India.

Skills: Presentation and oral communication skills, connect with the society to know the real state and accordingly can develop new public policies for better sustenance.

Unit-1: Health Policy – Ecology and Principles

- Social Development, Services and Healthcare
- Scope of Public Health Administration
- Challenges of Health in New Millennium
- Administration of Environmental Health Programmes

Unit-2: Policy-Making and Planning

- Administration of Family Planning Programme
- Reproductive and Child Health Programme
- Policy Making for Health Administration
- Planning for Health Care Administration

Unit-3: Organizational Framework for Implementation of Policy

- Health Care at Union Level
- Health Care at the State Level
- District Health Care
- International Health Care: Role of WHO

Unit-4: Health Justice

- Health-Harming Legal Doctrines
- Health Disparities and Structural Underpinnings
- Striving for Health Justice
- Health Justice in India

Unit-5: Managing the Public Health Enterprise

- Managing People
- Managing Partnerships
- Managing Communication
- Managing Business

Suggested Readings

1. Carrin, Buse, and Heggenbougen – Health Systems, Policy, Finance & Organization
2. Brij Mohan Mathur – Public Health Policy and Administration
3. Joel B Teitelbaum and Sara E Wilensky – Essentials of Health Policy and Law
4. Elizabeth Tobin-Tyler and Joel B Teitelbaum - Essentials of Health Justice
5. Friedman LH and Burke R - Management and Leadership in Public Health
6. Mahon A, Walshe K, Chambers N – A Reader in Health Policy and Management
7. Lal S – Public Health Management Principles and Practice
8. Kieran Walshe and Judith Smith – Healthcare Management
9. Taylor, Gebremichael M, Wagner C – Mapping Literature of Healthcare Management

SEMESTER – II

DEB-203: SCIENTIFIC WRITING AND CASE STUDIES (Total Credits: 08)

Course Description: Students are required to conduct a literature review and read a variety of academic papers in an area. Writing activities derive from the reading tasks and include synthesis of information from multiple sources to support research thesis/idea. Students are introduced to different types of scientific communication. As part of writing a scientific paper, they learn when to begin writing; how to prepare the text, including the abstract, introduction, materials and methods, results, discussion, acknowledgments, citation of references, and ethics in publishing. Students learn the publishing process for research articles as well as other opportunities for scientific communication, such as through conferences: abstract submission, oral and poster presentation.

Skills: Scientific writing is the only key to tackle the global health issues. Immediate reporting of any case or public health emergency (major infectious disease, mass unknown illness, etc.) which may possibly bring serious impacts on the country and society, is a prerequisite for the epidemiologists. In the coming years, the scientific data and healthcare experts will be trusted over unfounded conspiracy theories and self-serving politicians. Thus, to disseminate scientific information to the non-scientific community and to masses, one should know the art of scientific writing. This module will help in improving overall writing skills to communicate your ideas to the masses.

Unit-1: Scientific Literature

- Searching the scientific literature
- Using online search engines
- What is a refereed journal?
- Plagiarism and how to avoid it

Unit-2: Writing Task and Content

- Prewriting (Invention) and Writer's Block/Anxiety
- Developing an Outline
- Standard formats for scientific papers, research projects and theses
- Style Guides (For Citation Format)
- Bibliography or Annotated Bibliography
- Creating a literature review
- Preparing other sections of a research report (abstract, introduction, materials and methods, results and discussion, conclusions)
- Including and summarizing research data

Unit-3: Style and Grammar and Reference citations

- Scientific writing style
- First-person vs. Third-person; Passive vs. active voice
- Avoiding excessive wording

- Avoiding misuse of words
- How to use references
  - Within the text
  - How to make lists of references

Unit-4: Revising

- Dealing with revisions
- Accepting criticism
- Making sense of reviewers' comments
- Making the changes
- What to do if you don't agree with reviewers' comments

Unit-5: Other communications

- Case Studies
  - Selection of the Case
  - Drafting the Case
  - Data Collection
  - Analysing the case
  - Finalizing the Case
- Research Proposals
- Articles for popular press
- Oral Presentations
- Poster presentations

Suggested Readings

1. Poe M, Lerner N, and Craig J – Learning to Communicate in Science and Engineering
2. Barnes LB, Christensen CR, and Abby J Hansen – Teaching and the Case Method
4. Songjun Zeng et al – Case Studies and Testimonials
4. Flyvbjerg Bent – Five Misunderstandings about Case Study Research
5. Brian Budgell – Guidelines to the Writing of Case Studies
6. Micahel Alley – The Craft of Scientific Writing
7. William Ellet – The Case Study Handbook
8. Volkland D, Iles RL – Guidebook to Better Medical Writing