

Master of Public Health (M.P.H)

Specializations in:

- Epidemiology & Analysts
- Health Management & Policy

**Under Regulations- (R-2026 NCrf)
(w.e.f. 2026-27 admitted batch)**

Course Structure and Syllabi



**DEPT OF PUBLIC HEALTH
SCHOOL OF HEALTH SCIENCES
THE APOLLO UNIVERSITY
MURUKAMBATTU - CHITTOOR (Dt) 517127
ANDHRA PRADESH**

PROGRAM OUTCOMES (PO):

PO1: Epidemiological Proficiency- Graduates will demonstrate proficiency in analyzing epidemiological data to identify health trends and patterns.

PO2: Health Policy and Management- Graduates will be capable of developing, implementing and evaluating health policies and management strategies.

PO3: Disease Prevention and Control- Graduates will exhibit skills in designing and implementing disease prevention and control programs.

PO4: Research Skills - Graduates will possess research skills to conduct studies on public health issues and contribute to evidence-based practice.

PO5: Health Promotion- Graduates will promote health through education and community engagement initiatives.

PO6: Interdisciplinary Collaboration-Graduates will collaborate effectively with professionals from diverse disciplines to address public health challenges.

PO7: Public Health Ethics-Graduates will adhere to ethical principles and values in the practice of public health.

PO8: Leadership in Public Health-Graduates will demonstrate leadership qualities to influence public health policies and practices.

PO9: Environmental Health-Graduates will assess and manage environmental factors affecting public health.

PO10: Global Health Perspective-Graduates will understand global health issues and contribute to international public health efforts.

PO11: Health Equity-Graduates will advocate for equitable access to healthcare services and resources.

PO12: Lifelong Learning-Graduates will engage in continuous learning and professional development in the field of public health.

PROGRAM EDUCATIONAL OBJECTIVES (PEO):

PEO1: To contribute effectively to public health initiatives at local, national and global levels.

PEO2: To demonstrate leadership in public health management and policy development.

PEO3: To engage in continuous learning and professional development to address evolving public health challenges.

PROGRAM SPECIFIC OUTCOMES (PSO):

PSO1: Community Health Assessment-Students will be able to conduct community health assessments to identify health needs and priorities.

PSO2: Program Evaluation-Students will demonstrate proficiency in evaluating public health programs for effectiveness and efficiency.

PSO3: Policy Analysis and Development-Students will analyze public health policies and contribute to the development of evidence-based policies.

SCOPE:

This Academic regulation provide a framework for the regulatory guidelines of all programs offered by The Apollo University. It includes procedures and practices that are to be followed to ensure academic standards in the University. The regulations are approved by the Academic Council. These regulations may be amended from time to time with the approval of the Academic council for the benefit of students or some times to reflect the changes suggested by the statutory bodies.

Information regarding amendments (if any) to the regulations will be communicated to the students by publishing in the University website. Students must follow the amended regulations as they might impact the process for the award of degree. The decision of the Vice Chancellor shall be the final in case of any discrepancy. These regulations apply to all students, despite the program of study.

1. ADMISSION INTO THE PROGRAM

The University admits the students in two modes. One through the convenor quota as per the Andhra Pradesh Private Universities Act, for which the admissions will be carried out through the convener quota by the Govt of Andhra Pradesh. The other is through University quota for which the following procedure will be followed:

- A. The applicant shall satisfy the entrance requirements specified by The Apollo University and in accordance with guidelines of statutory councils for various Under-graduation /Post-graduation /Doctor of Philosophy programs.
- B. The Applicant shall be qualified in the qualifying examination for a particular program.
- C. The Applicant secures a rank in national level entrance exam or suitable such test conducted by The Apollo University / professional body.
- D. The Applicant qualifies in the specified state or national level examinations prescribed by The Apollo University.

The Apollo University will widely notify the counselling schedule for admissions into the academic programs in the media. The provisional admission will be given to the eligible students during the counseling scheduled by The Apollo University. The selected candidates will be provisionally admitted into the program of his/her choice if the candidate meets the program specific requirements in addition to

academic performance qualifying exam. Admission is purely based on merit and so merely meeting the requirements will not

ensure admission. The University does not discriminate based on gender, race, region, religion, disability or nationality. The University reserves the right to make admissions based on various criteria which is specified in the admission brochure.

2. ELIGIBILITY CRITERIA

Postgraduate programs

The qualifying exam eligibility for each program is given Annexure 2. The student should have passed the qualifying exam either in the year the student is seeking admission or the previous year.

University Quota: For getting admission under University quota, percentage of marks obtained in the qualifying exam, the rank obtained in TAU entrance exam or any recognized national level examination in the year of admission will be considered.

Counselling

All the eligible students need to apply for admission and have to attend counselling conducted by TAU as per the schedule for the university quota.

3. PROGRAMS

The Apollo University offers a Postgraduate program, Post graduate diploma and Research. The list of programs on offer for the academic year 2026-27 are annexed in Annexure 2.

Minimum duration of the program

The minimum duration of each program depends on the type of program, viz., undergraduate, postgraduate, integrated programs, etc. and the faculty which offers the program. The maximum duration of the program is N+2 years, where N stands for the minimum duration of the program as mentioned in Annexure 3. If the student has not obtained the minimum number of credits within the stipulated time, the Vice-Chancellor may extend the maximum duration in extenuating circumstances upon receiving a request along with reasons from the student for not completing the program on time.

ENTRY AND EXIT OPTIONS (MEES) - In strict accordance with UGC PG Regulations 2025 Clause 11.5(v), students completing 1 Year (Semesters I & II totaling 52 credits at NCrF Level 6) and opting to exit are awarded a Postgraduate Diploma in Public Health (PGDPH). Students completing the full 2-Year continuum (Semesters I-IV totaling 90 credits at Level 6.5/7) receive the Master of Public Health (MPH) degree in their chosen specialization track.

4. CHOICE BASED CREDIT SYSTEM

The choice-based credit system (CBCS) facilitates the education student-centric. It provides the opportunity for the learner to choose the courses from a basket of core, elective and skill enhanced courses. All programs of study are designed to meet the specified number of credit requirements. The courses taken by the student in each semester as part of program are allotted some credit points based on the number of hours assigned. Upon successful completion of the course, the student secures the number of credits allotted for that course. Once the minimum number of credits of the program is achieved, the degree can be awarded, subject to fulfillment of all other relevant conditions.

5. STRUCTURE OF THE PROGRAM

The Master of Public Health (MPH) programme is designed in accordance with the Outcome-Based Education (OBE) framework and the UGC Curriculum and Credit Framework for Postgraduate Programmes. The curriculum integrates classroom learning, laboratory training, seminars, research, and specialization electives to develop professional competencies required for public health practice, research, leadership, and policy.

The programme comprises the following academic components:

A. Programme Core Courses

These courses provide foundational and advanced competencies in epidemiology, biostatistics, public health systems, digital health, health economics, health promotion, research methods, ethics, leadership, and other essential domains of public health.

B. Field Visit / Practical Courses

Field visit courses provide practical training in public health practice, statistical computing, digital health applications, research methods, and advanced analytical techniques through hands-on learning.

C. Seminar Courses

Seminar courses develop competencies in scientific communication, critical appraisal of literature, academic writing, policy analysis, evidence synthesis, and professional presentation.

D. Programme Electives (Specialization)

Students shall choose one specialization track and complete four electives (12 credits), consisting of three campus-based electives and one approved online course offered through SWAYAM/NPTEL or other recognized national agencies, in accordance with the programme regulations.

E. Research Dissertation

The final semester is devoted to an independent research dissertation, scientific manuscript preparation, publication, viva voce examination, and dissemination of research findings.

Credit Framework

The programme follows the UGC Credit Framework.

Component	Credits
Programme Core Theory Courses	4 Credits each
Specialization Elective Courses	3 Credits each
Field Visit/Practical Courses	2 Credits each
Seminar Courses	1 Credit each
Dissertation, Publication & Viva Voce	16 Credits

The total credit requirement for the award of the Master of Public Health degree is 90 Credits.

Credit Allocation

Credits are assigned based on student learning hours in accordance with UGC regulations:

- One hour of classroom lecture per week throughout the semester is equivalent to one credit.
- One hour of tutorial per week throughout the semester is equivalent to one credit.
- Two hours of laboratory, practical, or field-based learning per week throughout the semester is equivalent to one credit.
- Seminar, project-based learning, research activities, and dissertation work shall carry credits as specified in the approved curriculum.

6. MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English.

7. REGISTRATION

Any of the following student must register for the courses opted in a particular semester during the scheduled registration period.

- A new student who enrolls into any program
- An existing student who is continuing on rolls from the preceding regular semester
- A former student, i.e., who has not enrolled in the preceding regular semester or who has availed academic break or detained and got readmission

Each newly admitted student shall attend an induction/ orientation program prior to commencement of the first semester. During this program academic advisors assist the students in choosing the courses. Existing student may register online by using their registration number and mail ID through the Apollo ERP portal. Class schedules are available approximately two weeks before the beginning of every semester for each program. The concerned head of the department must approve class schedule.

8. ATTENDANCE REQUIREMENTS

- Students should earn a minimum of 80% attendance in the current semester to become eligible to write the Semester End examinations.
- The monthly statement of attendance will be displayed on the Department Notice Board/ Apollo ERP by the respective departments within the first five working days of the following month.
- Candidates who are falling short of 80% attendance will be detained on the recommendation of the HoD and are not eligible to appear for the current semester examinations. The students who are detained in the current semester will not be allowed to register for the next semester and they must repeat the same semester by paying the tuition fee prescribed. However, they can write arrear subjects, if any.

9. EVALUATION

The assessment of the student's performance in a Theory course shall be based on two components: Continuous Evaluation (40 marks) and Semester-end examination (60 marks). A student has to secure an aggregate of 50% in the course in the two components put together to be declared to have passed the course, subject to the condition that the candidate must have secured a minimum of 30 marks (i.e. 50%) in the theory component at the semester-end examination. Practical/ Project Work/ Industrial Training/ Viva voce/ Seminar etc. are completely assessed under Continuous Evaluation for a maximum of 100 marks and a student has to obtain a minimum of 50% to secure Pass Grade. For courses having both theory and practical components, 60% of the weightage will be given for theory component and 40% weightage for practical component. The student must secure 50% (Theory + Practical) with 30 marks minimum in theory to attain pass grade.

Details of Assessment Procedure are furnished below

Table 1: Assessment Procedure

S. N	Component of Assessment	Marks Allotted	Type of Assessment	Scheme of Evaluation
1	Theory	40 60	Continuous Evaluation End Semester	i) Twenty (20) marks for mid examinations. Three mid examinations shall be conducted for 20 marks each; average of the best two performances shall be taken into consideration. ii) Ten (10) marks for Quizzes, Assignments and Presentations. iii) Ten (10) marks for periodic evaluation, case studies and projects iv) Sixty (60) marks for End Semester Exam.

10. GRADING SYSTEM

Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester in each course. The letter grades and the corresponding grade points are as given in Table 2.

Table 2: Grades & Grade Points

Sl. No.	Grade	Grade Points	Absolute Marks
1	O (Outstanding)	10	90 and above
2	A+ (Excellent)	9	80 to 89
3	A (Very Good)	8	70 to 79
4	B+ (Good)	7	65 to 69
5	B (Above average)	6	60 to 64
6	C (Average)	5	55 to 59
7	P (Pass)	4	50 to 54
8	F (Fail)	0	Less than 50
9	Ab. (Absent)	0	-

SEMESTER GRADE POINT AVERAGE (SGPA)

A Semester Grade Point Average (SGPA) for the semester will be calculated according to the formula:

$$SGPA = \frac{\sum [C \times G]}{\sum C}$$

Where, C = number of credits for the course,

G = grade points obtained by the student in the course.

A student who earns a minimum of 4 grade points (P grade) in a course is declared to have successfully completed the course and is deemed to have earned the credits assigned to that course.

CUMULATIVE GRADE POINT AVERAGE (CGPA)

A similar formula is used to arrive at Cumulative Grade Point Average (CGPA), considering the student's performance in all the courses taken in all the semesters up to the particular point of time.

Table 3 shows the CGPA required for the award of class after the successful completion of the program.

Table3:CGPA required for award of Class

Class	CGPA Required
First Class with Distinction	$\geq 8.0^*$
First Class	≥ 6.5
Second Class	≥ 5.5
Pass Class	≥ 5.0

*In addition to the required CGPA of 8.0 or more, the student must have necessarily passed all the courses of every semester in first attempt.

11. REAPPEARANCE

- A student who has secured 'F' grade in a Theory course shall have to reappear at the subsequent Semester end examination held for that course.
- A student who has secured 'F' grade in a Practical course shall have to attend Special Instruction Classes scheduled by the Department for securing pass.
- A student who has secured 'F' Grade in Project work / Industrial Training etc shall have to reappear for Viva -voce scheduled by the department.
- A student who is declared fail (F) in a course/s can apply for revaluation within one week from the date of publication of results with a fee prescribed by the university. The marks / grade awarded in the revaluation is final.

11.1 Procedure for revaluation

- The students who have not satisfied with the marks awarded by the examiner can apply for revaluation of his/her answer script/s
- The students must apply through proper channel for revaluation and to pay the revaluation fee per paper to the university towards revaluation fee.
- Students have to apply for revaluation within 7 days from the date publication of result. The scripts will get valued by second examiner and if the difference is more than 15 marks, they will get valued by the third examiner. The average of the nearest two marks will be declared as the final marks.

12. ASSESSMENT MECHANISM

The Apollo University offers students the benefits of Choice Based Credit System. Every paper is allotted to a certain number of credits as per the UGC norms. A student is awarded the specified credits on obtaining a pass on the respective paper.

The Choice Based Credit System (CBCS) has been adopted for all UG and PG Courses from the year 2023-24 onwards as per the recommendations of the A.P. State Council for Higher Education (APSCHE). The structure of undergraduate program provides a wide range of choices for students to opt for courses based on their eligibility, aptitude and career goals.

12.1 Semester End Examination

The End semester examination will be a comprehensive examination of 3 hours duration. Two End Semester examinations are conducted in a year-

- Odd semester examinations in November/ December and
- Even semester examination in May/June
- Practical examination / Project viva will be held 2 weeks prior to the theory semester end examinations.

Programs

Program	Continuous Assessment	End semester	Aggregate in End semester Examinations
MPH in Epidemiology & Analytics	No passing minimum	50%	50%
MPH in Public Health Management & Policy	No passing minimum	50%	50%

12.2 Post Evaluation Programme:

Under the Post Evaluation Program there are three menus:

- Provision for improvement
- Re-totalling and Revaluation of answer scripts
- Restrictions to appear for the examinations

12.3 Provision for improvement

A student who passes a paper in the first attempt can reappear for the same paper in the succeeding End-of-Semester examination only, for improving his/her marks. Re-appearance for improvement is allowed for theory and practical subjects of all semesters, except for the final semester subjects. Revised mark statement will be issued after withdrawing the previous one, if the marks obtained in improvement are higher than the marks awarded earlier. When there is no improvement,

there shall not be any change in the original marks already awarded. The improved marks shall be considered for classification but not for ranking.

Provision for Re-totalling and Revaluation of valued answer scripts

- Candidates/Scholars may apply for re-totalling / revaluation of valued answer scripts, to the Controller of Examinations through the Heads of Departments and Principal / Dean, in the prescribed forms, remitting the prescribed fee within 7 days from the date of publication of results. Revaluation of answer scripts is permissible only for the current semester papers and not for any arrear paper.
- Those wish to apply for revaluation of final semester papers can do so within five days from the date of publication of results. In re-valuation, the answer papers will be valued by an external examiner and if there is a difference of 15 marks between the two evaluations then the script will be sent for third valuation which is final and the mark awarded by the third examiner will be taken into the account.
- Revised mark statement will be issued after withdrawing the previous one, if the marks obtained in revaluation / retotalling are higher than the marks obtained earlier. In other cases, the original marks obtained earlier will be retained and the matter will be intimated to the student concerned as 'No change'.
- A candidate/Scholars who applies for revaluation should not apply for Re-Totalling.

Restrictions to appear for the examinations

Candidates who fail in any of the papers in the PG End semester examinations shall complete the paper concerned within N+2 years from the date of admission to the particular course. If they fail to do so, they shall re-register their names and take the examination in the texts/revised regulations/syllabus of the paper prescribed for the subsequent batch of candidates, in force at the time of their reappearance. In the event of removal of that paper consequent to change of regulation and/or curriculum after N+2 years period, the candidate shall have to take up an equivalent paper in the revised syllabus as suggested by the Chairman, Board of Studies concerned.

13. BETTERMENT OF GRADES

A student who has secured only a Pass or Second class and desires to improve his/her Class can appear for Betterment Examinations only in Theory courses of any Semester of his/her choice, conducted in Summer Vacation along with the Special Examinations. Betterment of Grades is permitted 'only once' immediately after completion of the study program.

14. DETENTION AND RE-ADMISSION

If a student fails to meet the minimum attendance requirement or minimum standards for academic progression, the concerned academic head will recommend it for detention and

it will be notified by the concerned Dean of the School. The students who are detained in the current semester will not be allowed to register for the next semester and they have to repeat the same semester.

The candidates who are detained or availed academic break or suspended in the previous semester/academic year and want to continue their study shall apply for re-admission to the university. The candidates shall request for re-admission to the respective Head of the Department, with details viz., Full Name, Registration Number, Department, School, Fee payment particulars with proofs and reasons for discontinuations. The concerned academic head will forward it to the Registrar with specific comments. The Registrar will notify the decision of re-admission which shall include the prescribed fee particulars, semester/ year into which readmission is granted and additional courses to be completed by the student (if any). The candidates should apply for re-admission in advance, which is before the commencement of the semester.

15. GROOMING AND ATTIRE FOR STUDENTS

Grooming and Etiquette is of great significance in the dynamic of shaping one's Personality. The Apollo University stands by a Code of Grooming, Attire and Etiquette that promotes a professional standard: Academic Day; Campus Placements and Non-Academic Hours on Campus.

The Dress Code to be in compliance on academic premises while attending: Formal Functions of the Institution / Lectures / Practical / Dining Area / Library / Labs / Office Areas. Students shall follow appropriate attire during Academic and Non-Academic hours on the campus. Students shall wear clean, neat, pressed and presentable clothing and command respect by dressing in accordance with responsible personal norms. Students shall always wear The Apollo University ID Card with the Lanyard.

Grooming and Formal Wear - Boys:

Formal Shirts / T-Shirts with a Collar should preferably be tucked in with a Formal pair of Pants Shoes and Socks to complete the Formal Attire. Personal Hygiene should be followed and Hair should be well groomed.

Smart Casuals for Boys:

Long Kurtas / Formals / Semi-Formal Shirts with Jeans.

Grooming and Formal Wear - Girls: Sarees / Salwar Suits / Leggings or Jeggings with Long Kurtis / Long Frocks / Long Skirts / Palazzos. Complement the outfit with proper footwear. Personal Hygiene should be followed and Hair should be well groomed.

Smart Casuals for Girls:

Jeans with long Kurtis / Long Skirts / Long Frocks.

Attire for Non-Academic Hours On Campus:

The Students should be neatly attired during Non-Academic Hours on Campus.

Dress Code for Boys:

Jeans / Track Suits / T-Shirts / Trousers / Shirts.

Dress Code for Girls:

Jeans / T-Shirts or Blouses / Salwar Suits / Palazzos / Leggings or Jeggings with Long Tops / Sarees / Long Skirts / Track Suits.

DO'S AND DON'TS FOR BOYS AND GIRL STUDENTS OF THE UNIVERSITY:

- To wear modest clothing that reflects the essence of good personal grooming standards.
- To refrain from wearing Sleeveless Clothing; Shorts; Short Tops, etc.,

PLEASE NOTE: The decision as to what constitutes Appropriate Attire vests with the Authorities of The Apollo University.

16. ELIGIBILITY FOR AWARD OF THE DEGREE

The post-graduation program may be of 2 years in duration for students who have completed either a 3-year or a 4-year Bachelor's program. A student shall be declared as eligible for the award of the degree if the candidate has successfully secured the minimum number of required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time.

After successful completion of the program, a provisional certificate cum memorandum of grades (PCMG) will be issued to the students. The PCMG includes the secured grades and class achieved in chosen program and specialization if any, along with grades and CGPA secured by the student. The original degree will be presented in subsequent convocation.

17. DISCRETION POWER

Not with-standing anything contained in the above sections, the Vice Chancellor may review all exceptional cases and give his decision, which will be final and binding.

ANNEXURE 1

ELIGIBILITY FOR QUALIFYING EXAM FOR POSTGRADUATE

Program Type	ELIGIBILITY	PG Programs 2026-27
Master's	Master of Public Health (M.P.H.)	Bachelor's Degree In Health Sciences/ Life Sciences/ Social Sciences From A Recognized University With At Least 50% Aggregate Marks.

ANNEXURE 2

PROGRAMS OFFERED FROM DEPT OF PUBLIC HEALTH, SCHOOL OF HEALTH SCIENCE FROM ACADEMIC YEAR 2026-27

Sl. No.	Program	Expanded	Level	Minimum Duration in Years (N)
1	M.P.H (Epidemiology & Analytics)	Master of Public Health in Epidemiology & Analytics	Master's	2
2	M.P.H (Health Management & Policy)	Master of Public Health in Health Management & Policy	Master's	2
3	PG.D.B.S	Post Graduate Diploma in Biostatistics	Master's Diploma	1
4	Ph.D (Health Sciences)	Doctor of Philosophy in Health Sciences	Doctoral	3 Yrs for Full Time & 4 Yrs for Part-time

Program : Master of Public Health (MPH)

Duration : 2 Years (4 Semesters)

Total Program Credits : 90 Credits

Mode of Delivery : Hybrid (Campus + SWAYAM/NPTEL + Approved Online Courses from ICMR and other recognized agencies)

Specialization Pathways

- MPH in Epidemiology & Analytics
- MPH in Health Management & Policy

Curriculum Framework: UGC-NEP 2020 -WHO Essential Public Health Functions (EPHFs) -ICAPHE -CEPH -ASPPH -SDGs -Outcome-Based Education (OBE)

FIRST YEAR

Semester I -Foundations of Public Health

Total Credits: 25 -Online Credits: 4 (16%)

Course Code	Course Name	Delivery Mode	L-T-P	Credits	Course Category	Assessment	WHO EPHP ICAPHE Alignment / Purpose
26MPHT6501	Foundations of Global & Planetary Health	Campus	3-1-0	4	Core	Graded	EPHP-3, Domain IV
26MPHT6502	Epidemiology	Campus	3-1-0	4	Core	Graded	EPHP-1, Domain V
26MPHT6503	Biostatistics & Data Science	Campus	3-1-0	4	Core	Graded	EPHP-11, Domain V
26MPHT6504	Public Health Systems & Governance	Campus	3-1-0	4	Core	Graded	EPHP-3, Domain IV
26MPHT6505	One Health & Emerging Public Health Challenges	SWAYAM (NPTEL)	3-1-0	4	Core	Graded	EPHP-5, Domain II
26MPHL6501	Public Health Practice Laboratory	Campus	0-0-2	2	Practical	Graded	Applied Epidemiology
26MPHL6502	Data Analytics Laboratory	Campus	0-0-2	2	Practical	Graded	Statistical Computing
26MPHS6501	Public Health Seminar	Campus	0-0-1	1	Seminar	Graded	Communication & Critical Review
	TOTAL		15-5-5	25			
26AUDT6001/a/b/c	Language Skills (English/French/Spanish)	Campus/Blended	2-0-0	0	Audit/ - non-credit	Satisfactory / Not Satisfactory	Global Employability
26AUDT6002	Foundations of Human Biology	Campus/Blended	2-0-0	0	Audit/ - non-credit	Satisfactory / Not Satisfactory	Academic Bridging

Semester II - Health Systems & Digital Public Health

Total Credits: 27 - Online Credits: 4 (14.81%)

Course Code	Course Name	Delivery Mode	L-T-P	Credits	Course Category	Assessment	WHO EPHF / ICAPHE Alignment / Purpose
26MPHT6506	Public Health Informatics & Digital Health	Campus	3-1-0	4	Core	Graded	EPHF-1, Domain V
26MPHT6507	Health Economics & Financing	Campus	3-1-0	4	Core	Graded	EPHF-4, Domain II
26MPHT6508	Health Promotion & Behaviour Change	Campus	3-1-0	4	Core	Graded	EPHF-7 & 8, Domain III
26MPHT6509	Public Health Ethics, Law and Human Rights	Campus	3-1-0	4	Core	Graded	EPHF-3, Domain VI
26MPHT6510	Systematic Reviews & Meta Analysis	Campus	3-1-0	4	Core	Graded	EPHF-10 & 11
26MPHT6511	Public Health Entrepreneurship & Consulting	SWAYAM (NPTEL)	3-1-0	4	Core	Graded	EPHF-9
26MPHL6503	Public Health Informatics Laboratory	Campus	0-0-2	2	Practical	Graded	Digital Health Applications
26MPHS6502	Public Health Seminar II	Campus	0-0-1	1	Seminar	Graded	Policy & Scientific Communication
	TOTAL		18-6-3	27			

SPECIALIZATION ELECTIVES (SEMESTER III)

Students are required to complete 12 Credits (Four Electives) from ONE of the following Specialization Tracks.

Semester III -Advanced Research & Specialization

Total Credits: 22 -Online Credits: 3 (13.64%)

Note: Students shall choose ONE Specialization and complete FOUR electives (12 Credits) consisting of Three Campus-based courses and One SWAYAM/NPTEL or approved online course from ICMR and other recognized agencies.

Course Code	Course Name	Delivery Mode	L-T-P	Credits	Course Category	Assessment	WHO EPHF / ICAPHE Alignment / Purpose
26MPHT 7501	Advanced Research Methods & Implementation Science	Campus	3-1-0	4	Core	Graded	EPHF-11; Research competency - advanced research design and implementation science.
26MPHT 7502	Public Health Leadership & Systems Thinking	Campus	3-1-0	4	Core	Graded	EPHF-3; Leadership competency - systems thinking, governance and strategic decision-making.
-	Specialization Elective I	Campus	2-1-0	3	Specialization Elective	Graded	Track-specific - advanced specialization competency.
-	Specialization Elective II	Campus	2-1-0	3	Specialization Elective	Graded	Track-specific - advanced specialization competency.

-	Specialization Elective III	Campus	2-1-0	3	Specialization Elective	Graded	Track-specific - advanced specialization competency.
-	Specialization Elective IV	SWAYAM/NPTL/Approved Online	0-0-0	3	Specialization Elective	Graded	Track-specific - flexible advanced online learning.
26MPHL 7501	Research Protocol Development & Advanced Analytics Lab	Campus	0-0-2	2	Research / Practical	Practical + Graded	EPHF-11; Research competency - protocol development and advanced data analysis.
TOTAL			14-6-2	22			

Semester IV -Dissertation & Professional Practice

Total Credits: 16 -Online Credits: 0 (0%)

Course Code	Course Name	Delivery Mode	L-T-P	Credit	Course Category	Assessment	WHO ICAPHE Alignment Purpose	EPHF
26MPHD751	Research Dissertation, Publication and Viva-Voce	Campus	0-0-16	16	Dissertation	Dissertation Viva-Voce	EPHF-11; Research competency - independent research publication and dissemination.	
TOTAL			0-0-16	16				

Specialization Track I - Epidemiology & Analytics

Course Code	Course Name	Delivery Mode	L-T-P	Credits	Course Category	Assessment	WHO EPHF / ICAPHE Alignment / Purpose
26MPHT7601	Infectious Disease Epidemiology	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-1; Epidemiology competency - disease surveillance and outbreak investigation.
26MPHT7602	Environmental Epidemiology	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-1; Epidemiology competency - environmental risk and population health assessment.
26MPHT7603	Clinical Trials & Implementation Science	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-11; Research competency - clinical trials and implementation research.
26MPHT7604	Spatial Epidemiology & GIS	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-1; Analytics competency - GIS, spatial analysis and disease mapping.
26MPHT7605	AI & Machine Learning in Public Health	SWAYAM (ICMR)	0-0-0	3	Specialization Elective	Graded	EPHF-1/11; Digital analytics competency - AI and predictive modelling.
26MPHT7606	Causal Inference & Advanced Analytics	SWAYAM (NPTEL)	0-0-0	3	Specialization Elective	Graded	EPHF-11; Analytics competency - causal inference and advanced

							statistical analysis.
26MPHT7607	Digital Epidemiology	SWAYAM	0-0-0	3	Specialization Elective	Graded	EPHF-1; Digital epidemiology competency - digital surveillance and population health monitoring.

Specialization Track II - Health Management & Policy

Course Code	Course Name	Delivery Mode	L-T-P	Credits	Course Category	Assessment	WHO EPHF / ICAPHE Alignment / Purpose
26MPHT7608	Healthcare Operations & Supply Chain	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-3; Management competency - healthcare operations and supply chain management.
26MPHT7609	Health Policy Analysis	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-3; Policy competency - policy analysis and evidence-informed decision-making.
26MPHT7610	Health Insurance & Managed Care	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-3; Management competency - health insurance and managed care.
26MPHT7611	Disaster & Health Emergency Management	Campus	2-1-0	3	Specialization Elective	Graded	EPHF-2; Emergency management competency - preparedness, response and resilience.
26MPHT7612	Healthcare Quality Accreditation & NABH	SWAYAM (NPT EL)	0-0-0	3	Specialization Elective	Graded	EPHF-10; Quality competency - healthcare quality and accreditation.
26MPHT7613	Health Technology Assessment	SWAYAM	0-0-0	3	Specialization Elective	Graded	EPHF-11; Evidence competency -

		(ICM R)					technology assessment and evidence- informed policy.
26MPHT7614	Global Health Diplomacy & Governance	SWA YAM	0-0- 0	3	Specialization Elective	Graded	EPHF-3; Governance competency - global health policy and diplomacy.

Program Credit Summary

Academic Year	Semester	Credits
First Year	Semester I	25
First Year	Semester II	27
Second Year	Semester III	22
Second Year	Semester IV	16
Total Program Credits		90

26MPHT6501: FOUNDATIONS OF GLOBAL & PLANETARY HEALTH



L-T-P-C: 3-1-0-4

Course Description

This course introduces the principles of global and planetary health, emphasizing the interdependence of human health, environmental sustainability, and global development. It examines health inequities, climate change, disease burden, global governance, and sustainable health systems to prepare students for addressing contemporary public health challenges.

UNIT I: Foundations of Global & Planetary Health

(10 Hours)

This unit introduces the concepts, evolution, and scope of global health, public health, international health, planetary health, and One Health. Students explore globalization, health equity, Sustainable Development Goals (SDGs), Universal Health Coverage (UHC), and the relationship between human civilization and environmental sustainability.

UNIT II: Planetary Health, Climate Change and Environmental Determinants

(14 Hours)

This unit examines climate change, biodiversity loss, ecosystem degradation, pollution, urbanization, food systems, water security, environmental justice, disaster risk reduction, and climate-sensitive diseases. It discusses mitigation, adaptation, and resilience strategies for protecting both human and planetary health.

UNIT III: Global Burden of Disease and Health Equity

(14 Hours)

This unit explores communicable diseases, non-communicable diseases, injuries, mental health, emerging infections, demographic transition, and epidemiological transition using Global Burden of Disease (GBD) metrics such as DALYs, YLLs, YLDs, and QALYs. The unit also addresses health inequities, migration, indigenous health, and social, commercial, and environmental determinants of health.

UNIT IV: Global Health Governance and Sustainable Health Systems

(12 Hours)

This unit examines the architecture of global health governance, including WHO, UNICEF, UNDP, UNEP, World Bank, GAVI, Global Fund, International Health Regulations (IHR), health diplomacy, Universal Health Coverage, Primary Health Care, Health in All Policies (HiAP), and sustainable health financing.

UNIT V: Future Directions in Global & Planetary Health

(10 Hours)

This unit focuses on emerging global challenges including antimicrobial resistance, pandemic preparedness, artificial intelligence, digital health, precision public health, green healthcare, carbon-neutral health systems, and leadership for resilient and sustainable public health systems.

Recommended Learning Resources

Suggested Textbooks

1. Myers SS, Frumkin H. Planetary Health: Protecting Nature to Protect Ourselves. Island Press; 2020.
2. Skolnik R. Global Health 101. 5th Edition. Jones & Bartlett Learning; 2024.

Reference Books

1. Merson MH, Black RE, Mills AJ. Global Health: Diseases, Programs, Systems, and Policies. 6th Edition. Jones & Bartlett Learning; 2022.
2. Lee K. Global Health Governance. Polity Press; 2009.
3. Frumkin H, editor. Environmental Health: From Global to Local. 3rd Edition. Jossey-Bass/Wiley; 2021.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-3: Health Protection (Environmental & Occupational Health), EPHF-4: Health Promotion, EPHF-5: Disease Prevention, EPHF-8: Public Health Leadership & Governance
ICAPHE Competency Framework	Domain IV: Environmental Health & Planetary Health
SDG Mapping	SDG 3 (Good Health & Well-being), SDG 6 (Clean Water & Sanitation), SDG 11 (Sustainable Cities), SDG 12 (Responsible Consumption), SDG 13 (Climate Action), SDG 14 (Life Below Water), SDG 15 (Life on Land), SDG 17 (Partnerships for the Goals)

Course Description

Epidemiology forms the scientific foundation of public health by investigating the distribution and determinants of health-related states in populations. This course equips students with core competencies in disease measurement, epidemiological study designs, causal inference, public health surveillance, and outbreak investigations. Students learn to interpret complex epidemiological data to guide evidence-based public health planning, intervention design, and policy development.

Course Objectives

- **CO1:** Explain the historical evolution, foundational concepts, and core principles of epidemiological practice.
- **CO2:** Calculate and interpret standardized measures of disease frequency, mortality, and epidemiological association.
- **CO3:** Differentiate the structural designs, strengths, and limitations of observational and experimental epidemiological studies.
- **CO4:** Apply rigorous epidemiological methodologies to public health surveillance systems and field outbreak investigations.
- **CO5:** Utilize epidemiological evidence and causal frameworks to inform public health planning, policy, and intervention strategies.

UNIT I: Foundations of Epidemiology**(10 Hours)**

This unit traces the history and evolution of epidemiology, detailing its core concepts, definitions, and operational scope in modern public health. It introduces the epidemiological triad, the natural history of disease, the spectrum of infection, and the distinct levels of prevention (primordial, primary, secondary, and tertiary). Students analyze the phenomenon of epidemiological transition and explore how population-based epidemiological methods are applied directly to clinical and public health decision-making.

UNIT II: Measures of Disease Frequency and Association**(14 Hours)**

This unit provides quantitative training in calculating and interpreting disease frequency indicators, including incidence, prevalence, and various mortality rates. Students examine the mathematical relationships between rates, ratios, and proportions. The unit focuses on measures of association, including relative risk, odds ratios, attributable risk, and population attributable risk, while introducing standardized rates, life table construction, and the practical application of these metrics to health data.

UNIT III: Epidemiological Study Designs**(14 Hours)**

This unit delivers a comprehensive examination of observational and experimental study designs used in public health research. It covers descriptive approaches, cross-sectional surveys, ecological studies, case-control matrices, and prospective or retrospective cohort designs. Students analyze experimental frameworks, including randomized controlled trials (RCTs) and quasi-experimental designs,

scrutinizing their respective strengths, operational limitations, and underlying ethical considerations.

UNIT IV: Screening, Surveillance and Outbreak Investigation

(12 Hours)

This unit examines the principles of population screening, focusing on validity metrics such as sensitivity, specificity, and positive/negative predictive values. It analyzes public health surveillance systems, detailing their types, operational attributes, and integration into national disease notification frameworks. Students learn the systematic, step-by-step methodology of field outbreak investigations, including the construction of epidemic curves and the coordination of rapid public health responses.

UNIT V: Causal Inference and Applications

(10 Hours)

This unit introduces the conceptual frameworks of causal inference, focusing on the application of the Bradford Hill criteria to establish public health causality. It examines systematic errors in epidemiological research, exploring the mechanisms of confounding, selection and information bias, effect modification, and causal pathways. The unit concludes with an analysis of epidemiology's application to chronic and infectious diseases, demonstrating how evidence is translated into public health policy.

Course Outcomes

- **CO1:** Explain fundamental epidemiological concepts, prevention levels, and disease transmission dynamics.
- **CO2:** Calculate, interpret, and cross-examine indicators of disease frequency, risk ratios, and population impacts.
- **CO3:** Critically appraise observational and experimental research designs to minimize methodological errors.
- **CO4:** Execute systematic field outbreak investigations and optimize disease surveillance frameworks.
- **CO5:** Synthesize epidemiological data and causal frameworks to formulate evidence-based health policies.

Recommended Learning Resources

Suggested Textbooks

1. Gordis L. Gordis Epidemiology. 6th Edition. Elsevier Saunders. 2018.
2. Friis RH, Sellers TA. Epidemiology for Public Health Practice. 6th Edition. Jones & Bartlett Learning. 2020.

Reference Books

1. Rothman KJ, Greenland S, Lash TL. Modern Epidemiology. 4th Edition. Wolters Kluwer. 2021.
2. Bonita R, Beaglehole R, Kjellström T. Basic Epidemiology. 2nd Edition. World Health Organization. 2006.
3. Szklo M, Nieto FJ. Epidemiology: Beyond the Basics. 4th Edition. Jones & Bartlett Learning. 2018.

Competency & Framework Alignment

Framework / Standard	Aligned Competency / Domain
WHO EPHF Mapping	Health Surveillance; Emergency Preparedness and Response; Public Health Intelligence
ICAPHE Competency	Epidemiological Methods; Research Competency; Biostatistics and Analytics
SDG Mapping	SDG 3: Good Health and Well-being; SDG 17: Partnerships for the Goals

Course Description

This course provides advanced statistical and analytical competencies required for evidence-based public health research and practice. It introduces descriptive and inferential statistics, probability distributions, sampling methodologies, regression modeling, data visualization, and data science paradigms. Emphasizing practical analysis, the course trains students to utilize modern statistical software to clean, manage, analyze, and present public health data to drive strategic decision-making.

Course Objectives

- **CO1:** Explain foundational statistical principles, data classification systems, and data management workflows in public health.
- **CO2:** Apply probability concepts, theoretical distributions, and scientific sampling techniques to public health datasets.
- **CO3:** Execute parametric and non-parametric hypothesis testing methods using standardized statistical frameworks.
- **CO4:** Formulate, interpret, and validate multivariable regression models for complex epidemiological data analysis.
- **CO5:** Utilize modern data science tools, advanced visualization dashboards, and ethical AI applications to communicate health data insights.

UNIT I: Foundations of Biostatistics and Data Management**(10 Hours)**

This unit covers data classification, differentiating measurement scales (nominal, ordinal, interval, and ratio) and data types within public health. It covers data collection methodologies, data cleaning workflows, data dictionary design, and quality assurance protocols. Students learn standard techniques for the tabular and graphical presentation of information, alongside descriptive statistics focusing on measures of central tendency, dispersion, and skewness using modern statistical computing environments.

UNIT II: Probability, Sampling and Distributions**(14 Hours)**

This unit introduces probability theory and its applications to biomedical and population health parameters. It details theoretical probability distributions, focusing on normal, binomial, and Poisson distributions, alongside the mathematical principles of the Central Limit Theorem. Students examine probability and non-probability sampling techniques, sample size determination calculations for varied study designs, and the systemic errors associated with sampling variance.

UNIT III: Inferential Statistics**(14 Hours)**

This unit focuses on hypothesis testing and confidence interval estimation within public health research. It provides rigorous training in parametric testing procedures, including student's t-tests, z-tests, Chi-square tests of independence, and Analysis of Variance (ANOVA). Students learn corresponding non-parametric alternatives, mastering the interpretation of statistical significance, Type I and Type II errors, statistical power, and their application to population health metrics.

UNIT IV: Regression and Multivariable Analysis

(12 Hours)



This unit addresses linear and non-linear relationships through correlation analysis and multivariable statistical modeling. It details the construction, diagnostics, and interpretation of simple and multiple linear regression models, alongside binary logistic regression matrices. Students explore predictive analytics, model-fitting processes, confounding adjustment techniques, and receive an introduction to survival analysis methods (Kaplan-Meier estimates and Cox Proportional Hazards).

UNIT V: Data Science Applications in Public Health

(10 Hours)

This unit explores the intersection of traditional biostatistics, advanced data science, and informatics within public health systems. It focuses on data visualization strategies, interactive dashboard design, and the principles of reproducible research workflows. Students are introduced to big data infrastructure, machine learning algorithms, and artificial intelligence applications in health forecasting, concluding with a review of data governance, privacy laws, and health data ethics.

Course Outcomes

- **CO1:** Execute data management, data quality assessments, and descriptive statistical profiles of health datasets.
- **CO2:** Determine appropriate sampling architectures and compute sample sizes required for robust public health research.
- **CO3:** Perform and interpret parametric and non-parametric inferential statistical tests to draw valid population inferences.
- **CO4:** Interpret multiple linear and logistic regression models to control for confounding variables in epidemiological studies.
- **CO5:** Build data visualization dashboards and apply data science workflows adhering to ethical data governance standards.

Recommended Learning Resources

Suggested Textbooks

1. Rosner B. Fundamentals of Biostatistics. 8th Edition. Cengage Learning. 2015.
2. Pagano M, Gauvreau K. Principles of Biostatistics. 2nd Edition. CRC Press. 2018.

Reference Books

1. Daniel WW, Cross CL. Biostatistics: A Foundation for Analysis in the Health Sciences. 11th Edition. Wiley. 2018.
2. Kirkwood BR, Sterne JAC. Essential Medical Statistics. 2nd Edition. Wiley-Blackwell. 2003.
3. Motulsky H. Intuitive Biostatistics: A Nonmathematical Guide to Statistical Thinking. 4th Edition. Oxford University Press. 2017.

Competency & Framework Alignment

Framework / Standard	Aligned Competency / Domain
WHO EPHF Mapping	Public Health Intelligence; Research and Knowledge Generation Health Surveillance
ICAPHE Competency	Biostatistics and Analytics; Data Analytics; Research Competency
SDG Mapping	SDG 3: Good Health and Well-being; SDG 9: Industry, Innovation and Infrastructure

Course Description

This course introduces the organization, governance, financing, and management of public health systems at national and global levels. It emphasizes health system strengthening, policy development, leadership, governance, Universal Health Coverage (UHC), and the role of public institutions in delivering equitable, efficient, and resilient health services.

Course

- **CO1:** Explain the structure, functions, and governance of public health systems and their role in improving **Objectives** population health.
- **CO2:** Examine the building blocks of health systems and approaches to health system strengthening.
- **CO3:** Analyze health policies, governance mechanisms, financing models, and regulatory frameworks.
- **CO4:** Evaluate leadership, accountability, quality improvement, and public health emergency preparedness within health systems.
- **CO5:** Recommend evidence-informed strategies for strengthening resilient, equitable, and sustainable public health systems.

UNIT I: Foundations of Public Health Systems**(10 Hours)**

This unit introduces the evolution, principles, and functions of public health systems. Students examine the organization of health systems globally and in India, essential public health functions, determinants of health, levels of healthcare delivery, public-private partnerships, and the role of governments in protecting and promoting population health.

UNIT II: Health System Building Blocks and Service Delivery**(14 Hours)**

This unit explores the World Health Organization's Health System Framework, including governance, service delivery, health workforce, health information systems, essential medicines and technologies, and health financing. Students examine primary health care, integrated service delivery, referral systems, quality of care, patient safety, and health system performance.

UNIT III: Health Governance, Policy and Financing**(14 Hours)**

Corporate Social Responsibility (CSR) & ESG in Health Governance - Mandatory CSR provisions under Section 135 of the Indian Companies Act. CSR funding landscape for community health, WASH, maternal-child health, and NCD control. Environmental, Social, and Governance (ESG) reporting standards, corporate health sustainability, and public-private-community partnerships (PPCPs).

This unit examines health governance principles, policy formulation, implementation, regulation, stewardship, decentralization, accountability, transparency, and multisectoral governance. Students study health economics, resource allocation, strategic purchasing, insurance models, Universal Health Coverage, National Health Policy, Ayushman Bharat, and international health financing mechanisms.

UNIT IV: Leadership, Health Management and System Resilience

(12 Hours)

This unit focuses on leadership theories, strategic management, organizational behavior, human resource management, change management, quality improvement, accreditation, digital governance, health information systems, emergency preparedness, pandemic response, and resilient health systems capable of responding to public health emergencies.

UNIT V: Emerging Trends and Future Directions in Public Health Governance (10 Hours)

This unit examines digital health governance, artificial intelligence, data-driven decision-making, precision public health, climate-resilient health systems, community participation, health equity, sustainable financing, global health diplomacy, and innovations shaping future public health systems.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Describe the structure, organization, and functions of public health systems at national and global levels.
- **CO2:** Evaluate health system performance using the WHO Health System Building Blocks framework.
- **CO3:** Analyze health governance, policy processes, financing mechanisms, and regulatory systems.
- **CO4:** Assess leadership, quality improvement, and resilience strategies for strengthening health systems.
- **CO5:** Design evidence-informed governance and management strategies to improve health system performance and equity.

Recommended Learning Resources

Suggested Textbooks

1. Roemer MI. National Health Systems of the World. Oxford University Press.
2. Johnson JK, Stoskopf CH, Shi L. Comparative Health Systems: A Global Perspective. 3rd Edition. Jones & Bartlett Learning; 2022.

Reference Books

1. World Health Organization. Everybody's Business: Strengthening Health Systems to Improve Health Outcomes -WHO Framework for Action. WHO; 2007.
2. World Health Organization. Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and Their Measurement Strategies. WHO; 2010.
3. Saltman RB, Rico A, Boerma GW, editors. Primary Care in the Driver's Seat? Organizational Reform in European Primary Care. Open University Press; 2006.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-3: Health Protection; EPHF-7: Assuring an Effective Public Health Workforce; EPHF-8: Public Health Leadership and Governance; EPHF-11: Public Health Management and Financing
ICAPHE Competency Framework	Domain IV: Health Policy, Health Systems and Management
SDG Mapping	SDG 3: Good Health and Well-being; SDG 10: Reduced Inequalities; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

26MPHT6505: ONE HEALTH & EMERGING PUBLIC HEALTH CHALLENGES



L-T-P-C: 3-1-0-4

Course Description

The interconnectedness of human, animal, and environmental systems requires integrated approaches to address complex modern public health threats. This course introduces the operational One Health framework, examining emerging zoonotic pathways, climate change, antimicrobial resistance, environmental degradation, and rapid urbanization. Students develop advanced systems-thinking capabilities to build multi-sectoral, collaborative solutions that enhance global health security and environmental sustainability.

Course Objectives

- **CO1:** Explain the historical evolution, operational definitions, and multi-sectoral governance models of the One Health paradigm.
- **CO2:** Analyze transmission dynamics, surveillance protocols, and emergency responses for emerging zoonotic spillover events.
- **CO3:** Assess the health consequences of climate change, environmental toxins, and ecological biodiversity losses.
- **CO4:** Evaluate international health security agendas, monitoring networks, and antimicrobial stewardship interventions.
- **CO5:** Design systems-based solutions incorporating digital innovations to mitigate future ecological and population health threats.

UNIT I: Foundations of One Health

(10 Hours)

This unit explores the history, conceptual frameworks, and operational dimensions of the One Health paradigm, analyzing the critical interfaces between human communities, domestic/wild animal populations, and shared ecosystems. It reviews planetary health models, ecological integrity metrics, and the institutional frameworks of the Quadripartite alliance (WHO, FAO, UNEP, WOA). Students examine the structural barriers, legislative mandates, and cross-sectoral financing required for unified health governance.

UNIT II: Emerging and Re-emerging Infectious Diseases

(14 Hours)

This unit examines the biological mechanisms governing pathogen spillovers, vector host dynamics, and mutation patterns at the animal-human interface. It details public health responses to high-consequence outbreaks, including COVID-19, Ebola, Nipah, Avian Influenza, and Mpox. Students analyze biosafety and biosecurity protocols, event-based early warning surveillance systems, field containment strategies, and the design of agile pandemic preparedness models.

UNIT III: Climate Change, Environment and Health

(14 Hours)

This unit evaluates the public health impacts of anthropogenic climate change, environmental degradation, macro-system modifications, and ecological imbalances. It addresses direct threats from air pollution, water contamination, industrial toxicity, biodiversity losses, and occupational workplace

hazards. Students examine the altering geography of climate-sensitive infectious vectors, food security vulnerabilities, and evidence-based environmental adaptation and mitigation policies.

UNIT IV: Antimicrobial Resistance and Global Health Security

(12 Hours)

This unit evaluates the drivers of antimicrobial resistance (AMR) across human medicine, veterinary practices, and agricultural runoffs. It reviews global AMR surveillance frameworks, antibiotic stewardship, and integrated national action plans. Students examine these factors within international health security agendas, disaster response matrices, emergency logistics operations, and structural interventions to build resilient health delivery networks.

UNIT V: Future Public Health Challenges and Innovations

(10 Hours)

This unit examines the public health pressures driven by rapid urbanization, massive demographic migration, and aging global populations. It highlights the integration of digital health ecosystems, artificial intelligence diagnostics, geospatial public health mapping, and precision prevention networks into future environmental frameworks. The unit concludes by reviewing the evolving professional competencies, ethical considerations, and multi-sectoral leadership needed to manage complex ecological health threats.

Course Outcomes

- **CO1:** Apply systems-thinking and One Health frameworks to model complex interactions at the human-animal-ecosystem interface.
- **CO2:** Formulate containment protocols and comprehensive surveillance frameworks for emerging zoonotic outbreaks.
- **CO3:** Evaluate environmental health data to design localized climate adaptation and mitigation policies.
- **CO4:** Synthesize cross-sectoral interventions to advance antimicrobial stewardship and strengthen health security networks.
- **CO5:** Build collaborative public health solutions that leverage digital innovations to address urbanization and environmental pressures.

Recommended Learning Resources

Suggested Textbooks

1. Mackenzie JS, Jeggo M, Daszak P, Richt JA. One Health: The Human-Animal-Environment Interfaces in Emerging Infectious Diseases. Springer. 2013.
2. Frumkin H. Environmental Health: From Global to Local. 3rd Edition. Jossey-Bass. 2016.

Reference Books

1. Butler CD. Climate Change and Global Health. 2nd Edition. CABI Publishing. 2016.
2. Gibbs EPJ. The Evolution of One Health: A Decade of Progress. CRC Press. 2022.
3. World Health Organization, FAO, UNEP, WOA. One Health Joint Plan of Action (2022-2026). Quadripartite Publication. 2022.

Competency & Framework Alignment

Framework / Standard	Aligned Competency / Domain
WHO EPHF Mapping	Emergency Preparedness; Environmental Health; Disease Prevention; Public Health Intelligence
ICAPHE Competency	Environmental and Planetary Health; Epidemiological Methods; Communication and Leadership
SDG Mapping	SDG 3: Good Health and Well-being; SDG 6: Clean Water and Sanitation; SDG 13: Climate Action; SDG 15: Life on Land

26MPHL6503: PUBLIC HEALTH PRACTICE LABORATORY



L-T-P-C: 0-0-2-2

Course Description

Community Experiential Learning & CSR Partnerships - Immersive field postings with Corporate Social Responsibility (CSR) foundation projects, community health centers, and public health NGOs.

This laboratory course provides hands-on training in essential public health tools, analytic operations, and field-based practices. Students apply theoretical concepts from epidemiology, biostatistics, health promotion, and environmental monitoring through sequential laboratory modules. The curriculum focuses on developing technical competencies in community health diagnosis, electronic health survey administration, statistical software analytics, and the generation of technical evidence reports.

Course Objectives

- **CO1:** Apply statistical and demographic calculation methodologies to map community health indicator profiles.
- **CO2:** Execute quantitative diagnostic evaluations of screening programs and outbreak investigation analytics.
- **CO3:** Conduct field-based community health needs assessments and design digital survey instruments.
- **CO4:** Utilize advanced statistical computing software to clean, manage, and analyze public health datasets.
- **CO5:** Formulate culturally competent risk communication campaigns and prepare technical public health evaluation records.

Module I: Demographic and Epidemiological Indicator Metrics (10 Hours)

- **Exercise 1:** Calculation and public health interpretation of standardized demographic, fertility, and population growth rate profiles. (4 Hours)
- **Exercise 2:** Computation of primary morbidity metrics, incident tracking, point/period prevalence, and crude/cause-specific mortality ratios. (6 Hours)

Module II: Field Methods and Survey Design (14 Hours)

- **Exercise 3:** Execution of a community diagnosis matrix, asset mapping, and baseline community profiling methodologies. (8 Hours)
- **Exercise 4:** Conceptual design, pilot validation, and programmatic setup of digital health mobile collection instruments (ODK/KoboToolbox). (6 Hours)

Module III: Statistical Computing and Data Operations (14 Hours)

- **Exercise 5:** Electronic data cleaning, outlier handling, variable recoding, and data dictionary construction workflows. (4 Hours)
- **Exercise 6:** Execution of descriptive statistics, bi-variate testing, and multivariate regression modeling using Jamovi, R, or SPSS. (6 Hours)

Module IV: Health Information Systems and Risk Communication (12 Hours)

- **Exercise 7:** Systemic retrieval, quality review, and critical analysis of data from national health

management information systems (HMIS/DHIS2). (4 Hours)

- **Exercise 8:** Production of evidence-based health promotion toolkits, behavior change print media, and instructional guidelines. (4 Hours)
- **Exercise 9:** Simulation of public risk communication strategies, crisis management planning, and press brief formulation. (4 Hours)

Module V: Program Evaluation and Evidence Presentation (10 Hours)

- **Exercise 10:** Execution of a programmatic review, logical framework mapping, and indicator tracking for an active national health intervention. (6 Hours)
- **Exercise 11:** Structural assembly, editing, and formatting of formal technical health project proposals and evaluation documentation. (4 Hours)
- **Exercise 12:** Consolidation of the laboratory portfolio, peer-reviewed evaluation presentation, and formal oral viva voce defense. (4 Hours)

Course Outcomes

- **CO1:** Calculate and interpret standardized demographic indicators and disease frequency metrics to profile population health.
- **CO2:** Build and validate digital data collection instruments optimized for field research.
- **CO3:** Perform data cleaning, hypothesis testing, and regression analysis using statistical software (Jamovi/R).
- **CO4:** Design evidence-based health communication materials and clear risk communication strategies for public health crises.
- **CO5:** Produce comprehensive technical reports evaluating the performance and logic models of public health programs.

Recommended Learning Resources

1. Centers for Disease Control and Prevention. The CDC Field Epidemiology Manual. Oxford University Press. 2018.
2. World Health Organization. Community Health Assessment and Group Evaluation (CHANGE) Toolkit. WHO Press. 2014.
3. National Health Mission. Operational Guidelines for HMIS and Quality Assurance. Ministry of Health and Family Welfare, Government of India. 2022.

Competency & Framework Alignment

Framework / Standard	Aligned Competency / Domain
WHO EPHF Mapping	Public Health Surveillance; Health Promotion; Community Engagement; Public Health Intelligence
ICAPHE Competency	Epidemiological Methods; Biostatistics and Analytics; Research Competency; Data Analytics

26MPHL6502: DATA ANALYTICS LABORATORY

L-T-P-C: 0-0-2-2

Course Description

Expanded Statistical Software Competency - Intensive practical training using R, Jamovi, IBM SPSS, and Stata for dataset management, multivariable regression, survival analysis, and epidemiological reporting.

This laboratory course provides hands-on training in statistical computing, data management, visualization, and basic data analysis for public health research. Students will develop practical skills using statistical software to organize, analyze, interpret, and present quantitative data for evidence-based public health decision-making.

Course Objectives

- **CO1:** Develop proficiency in data entry, cleaning, coding, and management using statistical software.
- **CO2:** Apply descriptive and inferential statistical techniques to public health datasets.
- **CO3:** Create tables, charts, and graphical visualizations for effective data presentation.
- **CO4:** Interpret statistical outputs and communicate findings in scientific formats.
- **CO5:** Demonstrate reproducible and ethical practices in statistical computing and data analysis.

Practical Content (60 Hours)

MODULE I: Introduction to Statistical Computing and Data Management (10 Hours)

- Introduction to statistical software (Jamovi/R/SPSS)
- Creating and importing datasets
- Variable types, coding, and labeling
- Data cleaning and validation
- Missing value management
- Data transformation and recoding
- Data documentation and reproducibility

MODULE II: Descriptive Statistics and Data Visualization (14 Hours)

- Frequency distributions
- Measures of central tendency and dispersion
- Cross-tabulations
- Charts and graphs (bar charts, histograms, box plots, scatter plots, line graphs)
- Exploratory data analysis
- Data visualization principles
- Preparing publication-quality tables and figures

MODULE III: Inferential Statistics Using Statistical Software (16 Hours)

- Normality assessment
- Confidence intervals
- t-tests (Independent and Paired)

- Chi-square test
- ANOVA
- Correlation analysis
- Simple linear regression
- Non-parametric tests
- Interpretation of statistical outputs

MODULE IV: Public Health Data Analysis and Reporting

(12 Hours)

- Analysis of epidemiological datasets
- Health survey data analysis
- Creating summary reports
- Exporting results
- Report writing using statistical outputs
- Reproducible workflows
- Data interpretation for policy and program decisions

MODULE V: Mini Project and Practical Applications

(8 Hours)

Students will independently analyze a real or simulated public health dataset by:

- Preparing the dataset
- Selecting appropriate statistical methods
- Performing analysis
- Developing tables and visualizations
- Interpreting findings
- Presenting results through a short technical report and oral presentation

Course Outcomes

Upon successful completion of the laboratory, students will be able to:

- **CO1:** Manage, clean, and prepare datasets using statistical software.
- **CO2:** Perform descriptive and basic inferential statistical analyses.
- **CO3:** Generate publication-quality tables, charts, and graphical outputs.
- **CO4:** Interpret statistical findings for public health research and decision-making.
- **CO5:** Conduct reproducible data analyses and prepare scientific analytical reports.

Recommended Learning Resources

Suggested Textbooks

1. Field A. Discovering Statistics Using IBM SPSS Statistics. 6th Edition. Sage Publications; 2024.
2. Navarro DJ, Foxcroft DR. Learning Statistics with Jamovi: A Tutorial for Psychology Students and Other Beginners. 2022 Edition.

Reference Books

1. Kirkwood BR, Sterne JAC. Essential Medical Statistics. 2nd Edition. Blackwell Science.
2. Rosner B. Fundamentals of Biostatistics. 9th Edition. Cengage Learning; 2025.
3. Motulsky HJ. Intuitive Biostatistics. 5th Edition. Oxford University Press; 2022.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-1: Public Health Surveillance; EPHF-2: Monitoring and Evaluation; EPHF-6: Public Health Research; EPHF-7: Workforce Development
ICAPHE Competency Framework	Statistical Computing and Data Analytics
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 17: Partnerships for the Goals

26MPHI6501: PUBLIC HEALTH SEMINAR I



L-T-P-C: 0-0-1-1

Course Description

This seminar course develops students' competencies in scientific communication, critical literature appraisal, evidence synthesis, and oral presentation. Students analyze contemporary public health research, policy briefs, and emerging epidemiological reports. The course reinforces academic writing standards, information retrieval methodologies, referencing ethics, and professional presentation techniques required for leadership roles in public health.

Course Objectives

- **CO1:** Appraise peer-reviewed public health literature using standardized critical appraisal tools.
- **CO2:** Synthesize complex scientific data into targeted, professional presentations.
- **CO3:** Apply rigorous academic writing and referencing standards while maintaining research integrity.
- **CO4:** Analyze current public health policy initiatives using evidence-informed evaluation matrices.
- **CO5:** Participate effectively in peer-led scientific discussions and professional debates.

Seminar Activities

- **Activity 1:** Critical review and structured presentation of a peer-reviewed public health journal article using STROBE/CONSORT guidelines. (3 Hours)
- **Activity 2:** Analysis and group presentation of a national or international public health policy brief or legislative reform. (3 Hours)
- **Activity 3:** Seminar presentation addressing an emerging global health threat, utilizing integrated multi-sectoral data. (3 Hours)
- **Activity 4:** Design, printing, and conference-style presentation of a scientific research poster detailing an epidemiological intervention. (2 Hours)
- **Activity 5:** Technical workshop covering academic writing, plagiarism detection, database searching, and reference management software (Mendeley/Zotero). (2 Hours)
- **Activity 6:** Submission of a comprehensive seminar portfolio, final reflective learning brief, and summary peer review. (2 Hours)

Course Outcomes

- **CO1:** Critically evaluate public health literature using standardized reporting checklists (PRISMA, STROBE).
- **CO2:** Synthesize and communicate complex health data through structured, professional presentations.
- **CO3:** Produce academic reports that adhere to international guidelines on research integrity and referencing ethics.
- **CO4:** Analyze health policies to evaluate their structural feasibility and alignment with evidence-based practices.
- **CO5:** Demonstrate active listening and professional communication skills in scientific panels and technical discussions.

Recommended Learning Resources

1. Greenhalgh T. How to Read a Paper: The Basics of Evidence-Based Medicine and Healthcare. 6th

- Edition. Wiley-BMJ Books. 2019.
2. Higgins JPT, Thomas J. Cochrane Handbook for Systematic Reviews of Interventions. 2nd Edition. Wiley-Blackwell. 2019.
 3. EQUATOR Network. Reporting Guidelines for Health Research (CONSORT, STROBE, PRISMA). Online Resource Matrix. 2025.

26AUDT6001 a/b/c: LANGUAGE SKILLS (ENGLISH / FRENCH / SPANISH)



L-T-P-C: 2-0-0-0

Course Category: Value-Added Audit Course (Non-Credit)

Course Description

This value-added audit course is designed to enhance students' language proficiency, cross-cultural health communication, and professional writing capabilities in English, French, or Spanish. Tailored for public health professionals operating in diverse national and international environments, the course focuses on specialized medical/public health vocabulary, scientific literature comprehension, professional correspondence, and oral presentation skills required for global public health practice and diplomacy.

Course Objectives

- CO1: Explain fundamental grammatical structures, phonetics, and language conventions in the selected language.
- CO2: Acquire specialized public health, medical, and epidemiological vocabulary for technical communication.
- CO3: Critically read and comprehend peer-reviewed public health literature, policy briefs, and international health reports.
- CO4: Deliver clear, persuasive oral presentations and participate effectively in cross-cultural public health discussions.
- CO5: Author professional emails, technical project briefs, field reports, and academic summaries adhering to international conventions.

Course Content

UNIT I: Foundations of Grammar, Vocabulary & Phonetics (6 Hours)

Review of core grammatical structures, sentence construction, tenses, active/passive voice, and prepositions in the target language. Pronunciation, phonetics, and articulation of complex technical terms. Basic conversational greetings, introductions, and everyday dialogue in professional and academic settings.

UNIT II: Technical & Public Health Vocabulary (6 Hours)

Terminology related to disease prevention, epidemiology, health systems, biostatistics, environmental health, and outbreak investigations. Translating complex health concepts into layperson language for community communication. Lexicon of global health organizations (WHO, UNICEF, CDC, MSF) and multilateral health agreements.

UNIT III: Reading Comprehension & Scientific Review (6 Hours)

Strategies for reading peer-reviewed journal articles, executive summaries, and global health bulletins. Identifying main arguments, methodological frameworks, and research conclusions. Annotation, summary writing, and critical appraisal of scientific texts in the target language.

UNIT IV: Oral Communication & Professional Presentations (6 Hours)

Public speaking techniques, voice modulation, and audience engagement strategies. Structuring and delivering 10-minute scientific presentations. Conducting stakeholder interviews, focus group moderations, and risk communication simulations in community and emergency settings.

UNIT V: Professional Writing & Technical Correspondence

(6 Hours)

Writing formal emails, meeting agendas, minutes of meetings (MoM), field visit summaries, and project progress briefs. Fundamentals of policy brief drafting and grant proposal summaries. Avoiding plagiarism, mastering citation conventions, and refining academic tone.

Course Outcomes

Upon successful completion of this audit course, students will be able to:

- **CO1:** Demonstrate proficiency in grammar, pronunciation, and functional communication in the chosen language.
- **CO2:** Utilize specialized public health terminology accurately in academic and field settings.
- **CO3:** Analyze scientific health literature and policy documentation written in the target language.
- **CO4:** Deliver structured oral presentations and risk communication briefings confidently.
- **CO5:** Write clear, concise, and professional correspondence, field records, and academic reports.

Recommended Learning Resources

Suggested Textbooks

1. Glendinning EH, Howard R. *Professional English in Use: Medicine*. Cambridge University Press; 2021.
2. Gledhinning EH, Pohl A. *Oxford English for Careers: Nursing & Health Sciences*. Oxford University Press; 2020.
3. Miquel R, Sans N. *Rápido Rápido: Spanish for Global Health Professionals*. Difusión; 2022.
4. Tolas C. *Le Français Health and Medical Practice (B1/B2)*. CLE International; 2023.

Reference Books

1. World Health Organization. *WHO Style Guide: Preparing Documents for Publication*. WHO Press; 2021.
2. Murphy R. *English Grammar in Use*. 5th Edition. Cambridge University Press; 2019.

Competency & Framework Alignment

Framework Standard	Aligned Competency / Domain
WHO EPHF Mapping	EPHF-7: Public Health Workforce Development; EPHF-9: Leadership, Governance, and Communication
ICAPHE Competency	Domain III: Health Communication, Community Engagement, and Professional Leadership
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 17: Partnerships for the Goals

26AUDT6002: FOUNDATIONS OF HUMAN BIOLOGY



L-T-P-C: 2-0-0-0

Course Category: Value-Added Audit Course (Non-Credit)

Course Description

This foundational audit course serves as an essential bridge module for Master of Public Health students entering from non-medical, non-life science, or social science backgrounds. It provides a comprehensive introduction to human anatomy, physiology, cellular biology, organ systems, immunology, and biological mechanisms of disease. Understanding these biological principles enables students to effectively grasp epidemiological concepts, disease transmission dynamics, and clinical public health interventions.

Course Objectives

- **CO1:** Explain the structural organization of the human body from cellular levels to major organ systems.
- **CO2:** Describe the physiological functions and homeostatic mechanisms of key human body systems.
- **CO3:** Examine the biological pathways of communicable and non-communicable disease pathogenesis.
- **CO4:** Analyze host defense mechanisms, immunology, and principles of immunization.
- **CO5:** Apply biological concepts to population-level public health challenges and disease prevention strategies.

Course Content (30 Hours)

UNIT I: Cellular Biology, Tissues & Homeostasis

(6 Hours)

Cell structure and organelle functions. Cell membrane transport, cell division (mitosis and meiosis), and genetic material (DNA/RNA replication). Basic histology: epithelial, connective, muscle, and nervous tissues. Concept of internal environment and homeostatic feedback mechanisms.

UNIT II: Cardiovascular, Respiratory & Renal Systems

(6 Hours)

Anatomy and physiology of the heart, blood vessels, and systemic/pulmonary circulation. Blood components, oxygen transport, and blood pressure regulation. Respiratory tract structure, gas exchange mechanisms, and lung capacities. Renal anatomy, nephron function, fluid-electrolyte balance, and excretion.

UNIT III: Digestive, Endocrine & Metabolic Systems

(6 Hours)

Structure and digestive functions of the gastrointestinal tract (GI tract). Nutrient absorption, liver metabolism, and gut microbiome. Endocrine glands (pituitary, thyroid, pancreas, adrenal) and hormonal regulation of growth, metabolism, glucose control (insulin/glucagon), and stress responses.

UNIT IV: Nervous, Musculoskeletal & Reproductive Systems

(6 Hours)

Central and peripheral nervous system organization. Neurotransmitters, sensory perception, and autonomic nervous system regulation. Basic musculoskeletal anatomy. Male and female reproductive anatomy, menstrual cycle, fertilization, pregnancy, and fetal development foundations.

UNIT V: Immunology, Host Defense & Pathophysiology Foundations

(6 Hours)

Innate and adaptive immunity: barriers, cellular defenses (leukocytes, macrophages), antibodies, and lymphatic system. Mechanisms of inflammation, hypersensitivity, and auto-immunity. Biological bases of infectious disease spillovers, oncogenesis, vascular atherosclerosis, and metabolic syndrome.

Principles of active and passive immunization.

Course Outcomes

Upon successful completion of this audit course, students will be able to:

- **CO1:** Identify and describe the anatomical components and cellular structures of the human body.
- **CO2:** Explain normal physiological processes and homeostatic regulation across major organ systems.
- **CO3:** Describe the biological mechanisms underpinning communicable infections and chronic non-communicable disorders.
- **CO4:** Differentiate between innate and adaptive immune responses and explain vaccine-induced immunity.
- **CO5:** Integrate human biological principles into public health research, epidemiological modeling, and disease control planning.

Recommended Learning Resources

Suggested Textbooks

1. Waugh A, Grant A. *Ross & Wilson Anatomy and Physiology in Health and Illness*. 14th Edition. Elsevier; 2022.
2. Hall JE, Hall ME. *Guyton and Hall Textbook of Medical Physiology*. 14th Edition. Saunders; 2021.
3. Marieb EN, Hoehn K. *Human Anatomy & Physiology*. 11th Edition. Pearson; 2019.

Reference Books

1. Kumar V, Abbas AK, Aster JC. *Robbins Basic Pathology*. 10th Edition. Elsevier; 2018.
2. Park K. *Park's Textbook of Preventive and Social Medicine*. 27th Edition. Banarsidas Bhanot Publishers; 2023.

Competency & Framework Alignment

Framework / Standard	Aligned Competency / Domain
WHO EPHF Mapping	EPHF-1: Health Surveillance; EPHF-3: Health Protection; EPHF-5: Disease Prevention
ICAPHE Competency	Domain V: Epidemiological Methods & Biological Sciences in Public Health
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education

Course Description

This course introduces the principles and applications of public health informatics and digital health in strengthening health systems and improving population health. It covers health information systems, digital technologies, artificial intelligence, big data, telemedicine, and data governance to support evidence-based public health practice and decision-making.

Course Objectives

- **CO1:** Explain the concepts, principles, and applications of public health informatics and digital health.
- **CO2:** Examine health information systems, digital platforms, and data standards used in healthcare and public health.
- **CO3:** Analyze the role of artificial intelligence, big data, geographic information systems, and digital innovations in disease surveillance and public health decision-making.
- **CO4:** Evaluate digital health governance, cybersecurity, data privacy, interoperability, and ethical considerations.
- **CO5:** Design evidence-informed digital health solutions to strengthen healthcare delivery, disease surveillance, and public health programs.

Course Content (60 Hours)**UNIT I: Foundations of Public Health Informatics and Digital Health (10 Hours)**

This unit introduces the concepts, evolution, and scope of public health informatics, biomedical informatics, and digital health. Students explore digital transformation in healthcare, health information systems, electronic health records, health data ecosystems, interoperability, digital public goods, and the role of informatics in strengthening health systems. The unit also discusses the WHO Global Strategy on Digital Health and India's Digital Health Mission.

UNIT II: Health Information Systems and Digital Technologies (14 Hours)

This unit examines the design, implementation, and management of health information systems at local, national, and global levels. Students learn about electronic health records (EHRs), hospital information systems (HIS), laboratory information systems (LIS), disease surveillance systems, registries, mobile health (mHealth), telemedicine, wearable technologies, cloud computing, Internet of Medical Things (IoMT), and interoperability standards such as HL7 and FHIR.

UNIT III: Data Analytics, Artificial Intelligence and Decision Support (14 Hours)

This unit focuses on data-driven public health using statistical computing, big data analytics, machine learning, artificial intelligence, predictive modeling, geographic information systems (GIS), dashboards, and business intelligence tools. Students explore applications in disease surveillance, outbreak prediction, precision public health, digital epidemiology, decision support systems, and health program monitoring and evaluation.

UNIT IV: Digital Health Governance, Ethics and Cybersecurity (12 Hours)

This unit examines governance frameworks for digital health, including data governance, health informatics standards, cybersecurity, privacy, confidentiality, informed consent, ethical use of health data, digital inclusion, algorithmic bias, and regulatory frameworks. Students also study national and international digital health policies, data protection legislation, and governance of artificial intelligence in healthcare.

UNIT V: Emerging Innovations and Future Directions in Digital Health (10 Hours)

This unit explores emerging technologies including blockchain, precision medicine, genomics, digital twins, robotics, virtual reality, Internet of Things (IoT), remote patient monitoring, smart hospitals, digital therapeutics, and climate-smart digital health systems. The unit also discusses entrepreneurship, innovation ecosystems, and future workforce competencies required for digital public health.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Describe the principles, components, and applications of public health informatics and digital health.
- **CO2:** Evaluate health information systems, digital platforms, and interoperability standards for effective healthcare delivery.
- **CO3:** Apply digital technologies, artificial intelligence, and data analytics to support surveillance, research, and evidence-based decision-making.
- **CO4:** Assess ethical, legal, governance, and cybersecurity issues related to digital health implementation.
- **CO5:** Recommend innovative digital health solutions to improve public health programs, healthcare quality, and health system resilience.

Recommended Learning Resources

Suggested Textbooks

1. Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public Health Informatics and Information Systems. 3rd Edition. Springer; 2017.
2. Hoyt RE, Yoshihashi AK. Health Informatics: Practical Guide for Healthcare and Information Technology Professionals. 8th Edition. Lulu Press; 2023.

Reference Books

1. Shortliffe EH, Cimino JJ, editors. Biomedical Informatics: Computer Applications in Health Care and Biomedicine. 5th Edition. Springer; 2021.
2. Friedman CP, Wyatt JC. Evaluation Methods in Biomedical and Health Informatics. 2nd Edition. Springer; 2017.
3. World Health Organization. Global Strategy on Digital Health 2020-2025. WHO; 2021.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-1: Public Health Surveillance; EPHF-2: Monitoring and Evaluation; EPHF-6: Research and Knowledge Generation; EPHF-7: Public Health Workforce Development
ICAPHE Competency Framework	Domain V: Public Health Informatics, Digital Health, and Health Information Systems
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This course introduces the principles of health economics and healthcare financing, emphasizing efficient resource allocation, economic evaluation, health insurance, and financing strategies for achieving Universal Health Coverage (UHC). Students develop competencies to apply economic principles in health policy, planning, priority setting, and sustainable health system financing.

Course Objectives

- **CO1:** Explain the fundamental concepts and principles of health economics and their application to public health.
- **CO2:** Examine healthcare demand, supply, markets, financing mechanisms, and insurance models.
- **CO3:** Analyze economic evaluation techniques used in public health decision-making and health technology assessment.
- **CO4:** Evaluate healthcare financing systems, resource allocation, budgeting, and financial protection strategies.
- **CO5:** Recommend evidence-informed financing policies to strengthen equitable, efficient, and sustainable health systems.

UNIT I: Foundations of Health Economics**(10 Hours)**

This unit introduces the principles, scope, and importance of health economics in public health. Students explore concepts of scarcity, opportunity cost, efficiency, equity, demand and supply of healthcare, market failures, externalities, public and private goods, asymmetric information, and the economic rationale for government intervention in health. The unit also examines health as human capital and healthcare as an investment.

UNIT II: Healthcare Markets, Financing and Insurance**(14 Hours)**

This unit examines healthcare financing mechanisms, including taxation, social health insurance, private health insurance, community-based financing, and out-of-pocket expenditure. Students learn about risk pooling, provider payment methods, strategic purchasing, reimbursement mechanisms, public-private partnerships, Universal Health Coverage (UHC), Ayushman Bharat, and health financing reforms in India and globally.

UNIT III: Economic Evaluation and Health Technology Assessment**(14 Hours)**

This unit focuses on methods of economic evaluation, including cost analysis, cost-minimization analysis, cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis, and budget impact analysis. Students examine Quality-Adjusted Life Years (QALYs), Disability-Adjusted Life Years (DALYs), Incremental Cost-Effectiveness Ratio (ICER), Health Technology Assessment (HTA), priority setting, and resource allocation using economic evidence.

UNIT IV: Health System Financing, Budgeting and Financial Management**(12 Hours)**

This unit examines financial planning and management within health systems, including health budgeting, programme-based budgeting, financial accountability, expenditure tracking, national health accounts, fiscal sustainability, provider payment systems, purchasing mechanisms, and financing for public health

programmes. Students also explore performance-based financing, donor funding, and financing during public health emergencies.

UNIT V: Emerging Trends and Future Directions in Health Economics (10 Hours)

This unit explores current and future issues in health economics, including value-based healthcare, digital health economics, pharmaceutical economics, economic implications of climate change, pandemic financing, behavioral economics, investment in prevention, global health financing, and sustainable financing strategies to achieve the Sustainable Development Goals.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles and applications of health economics in public health decision-making.
- **CO2:** Analyze healthcare financing systems, insurance models, and financial protection mechanisms.
- **CO3:** Apply economic evaluation methods to assess public health interventions and technologies.
- **CO4:** Evaluate budgeting, resource allocation, and financial management strategies within health systems.
- **CO5:** Recommend evidence-based financing policies that promote equity, efficiency, and Universal Health Coverage.

Recommended Learning Resources

Suggested Textbooks

1. Morris S, Devlin N, Parkin D, Spencer A. Economic Analysis in Health Care. 3rd Edition. Wiley-Blackwell; 2024.
2. Glied SA, Smith PC, editors. The Oxford Handbook of Health Economics. Oxford University Press; 2013.

Reference Books

1. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. Methods for the Economic Evaluation of Health Care Programmes. 5th Edition. Oxford University Press; 2024.
2. Folland S, Goodman AC, Stano M. The Economics of Health and Health Care. 9th Edition. Routledge; 2024.
3. Palmer S, Raftery J. Health Economics: An Introduction for Health Professionals. BMJ Books/John Wiley & Sons.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-4: Health Promotion and Social Participation; EPHF-8: Public Health Leadership and Governance; EPHF-11: Public Health Management and Financing
ICAPHE Competency Framework	Domain II: Health Economics, Health Financing, and Resource Management
SDG Mapping	SDG 1: No Poverty; SDG 3: Good Health and Well-being; SDG 8: Decent Work and Economic Growth; SDG 10: Reduce Inequalities; SDG 17: Partnerships for the Goals

Course Description

This course introduces the principles and practice of health promotion and behaviour change in public health. It examines behavioural theories, health communication strategies, community engagement, and policy interventions that empower individuals and communities to adopt healthy lifestyles and improve population health outcomes.

Course Objectives

- **CO1:** Explain the concepts, principles, and determinants of health promotion and behaviour change.
- **CO2:** Examine major behavioural science theories and models applicable to public health interventions.
- **CO3:** Analyze health communication, social marketing, and community engagement strategies for promoting healthy behaviours.
- **CO4:** Evaluate health promotion programmes across diverse populations using evidence-based approaches.
- **CO5:** Design comprehensive health promotion interventions addressing behavioural, social, and environmental determinants of health.

Course Content (60 Hours)**UNIT I: Foundations of Health Promotion and Behaviour Change****(10 Hours)**

This unit introduces the concepts, principles, evolution, and scope of health promotion and behaviour change. Students examine determinants of health, health literacy, wellness, disease prevention, health education, and empowerment. The unit explores the Ottawa Charter for Health Promotion, Jakarta Declaration, Bangkok Charter, Sustainable Development Goals (SDGs), Health in All Policies (HiAP), and the role of health promotion in primary health care and Universal Health Coverage.

UNIT II: Behavioural Science Theories and Models**(14 Hours)**

This unit examines the theoretical foundations of health behaviour, including the Health Belief Model, Theory of Planned Behaviour, Theory of Reasoned Action, Transtheoretical Model, Social Cognitive Theory, Diffusion of Innovation Theory, Ecological Model, PRECEDE-PROCEED Model, and Behaviour Change Wheel (COM-B Framework). Students learn how behavioural theories guide the planning, implementation, and evaluation of public health interventions.

UNIT III: Health Communication, Social Marketing and Community Engagement (14 Hours)

This unit focuses on evidence-based communication strategies for behaviour change. Topics include interpersonal communication, health counselling, Information, Education and Communication (IEC), Behaviour Change Communication (BCC), Social and Behaviour Change Communication (SBCC), risk communication, crisis communication, social marketing, media advocacy, digital health communication, health literacy, community mobilization, participatory approaches, and stakeholder engagement.

UNIT IV: Planning, Implementation and Evaluation of Health Promotion Programmes **(12 Hours)**

This unit examines systematic approaches to designing, implementing, monitoring, and evaluating health promotion programmes. Students learn needs assessment, programme planning, logic models, intervention mapping, behavioural surveillance, process evaluation, outcome evaluation, impact assessment, quality improvement, and implementation science. Case studies from communicable diseases, non-communicable diseases, maternal and child health, mental health, nutrition, and tobacco control are discussed.

UNIT V: Emerging Trends and Future Directions in Health Promotion (10 Hours)

This unit explores emerging approaches in health promotion, including digital health promotion, artificial intelligence, mobile health applications, behavioural economics, nudging, precision public health, climate-sensitive health promotion, workplace wellness, healthy cities, school health, policy advocacy, and leadership for sustainable health promotion programmes.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles, determinants, and strategies of health promotion and behaviour change.
- **CO2:** Apply behavioural science theories to design evidence-based public health interventions.
- **CO3:** Develop effective health communication and social marketing strategies for diverse populations.
- **CO4:** Evaluate health promotion programmes using appropriate planning, monitoring, and evaluation frameworks.
- **CO5:** Design comprehensive, community-based health promotion interventions that address behavioural, social, and environmental determinants of health.

Recommended Learning Resources

Suggested Textbooks

1. Glanz K, Rimer BK, Viswanath K, editors. Health Behavior: Theory, Research, and Practice. 6th Edition. Jossey-Bass; 2024.
2. Naidoo J, Wills J. Foundations for Health Promotion. 6th Edition. Elsevier; 2022.

Reference Books

1. Green LW, Kreuter MW. Health Program Planning: An Educational and Ecological Approach. 4th Edition. McGraw-Hill.
2. Bartholomew Eldredge LK, Markham CM, Ruiter RAC, Fernández ME, Kok G, Parcel GS. Planning Health Promotion Programs: An Intervention Mapping Approach. 4th Edition. Jossey-Bass; 2016.
3. Rice RE, Atkin CK, editors. Public Communication Campaigns. 5th Edition. Sage Publications; 2024.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-4: Health Promotion; EPHF-7: Community Engagement and Social Participation; EPHF-8: Public Health Leadership and Governance
ICAPHE Competency Framework	Domain III: Health Promotion, Health Communication, Community Engagement, and Behavioural Sciences
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 5: Gender Equality; SDG 10: Reduced Inequalities; SDG 11: Sustainable Cities and Communities; SDG 17: Partnerships for the Goals

Course Description

This course examines the ethical, legal, and human rights dimensions of public health practice. It explores ethical principles, legal frameworks, regulatory systems, and human rights approaches that guide public health decision-making, research, policy development, and healthcare delivery while balancing individual rights with population health interests.

Course Objectives

- **CO1:** Explain the principles, theories, and frameworks of public health ethics, health law, and human rights.
- **CO2:** Examine national and international legal frameworks governing public health, healthcare, and biomedical research.
- **CO3:** Analyze ethical dilemmas in disease prevention, surveillance, emergency preparedness, digital health, and emerging technologies.
- **CO4:** Evaluate the role of human rights, equity, justice, and accountability in public health policy and practice.
- **CO5:** Apply ethical reasoning and legal principles to address complex public health challenges and promote rights-based public health interventions.

UNIT I: Foundations of Public Health Ethics, Law and Human Rights**(10 Hours)**

This unit introduces the concepts, scope, and evolution of public health ethics, health law, and human rights. Students examine ethical theories, principles of autonomy, beneficence, non-maleficence, justice, solidarity, reciprocity, proportionality, and stewardship. The unit also explores the relationship between ethics, law, governance, and public health practice, emphasizing rights-based approaches to population health.

UNIT II: Legal and Regulatory Frameworks in Public Health**(14 Hours)**

This unit examines the legal foundations of public health at national and international levels. Topics include constitutional provisions for health, public health legislation, communicable disease control laws, environmental health regulations, food safety laws, occupational health legislation, mental health legislation, disaster management, International Health Regulations (IHR 2005), and the legal responsibilities of public health authorities. Students also review major Indian public health laws and regulatory institutions.

UNIT III: Ethics in Public Health Practice and Research**(14 Hours)**

This unit focuses on ethical issues encountered in public health programmes, epidemiological surveillance, screening, vaccination, outbreak investigations, and health promotion. Students examine research ethics, informed consent, confidentiality, privacy, vulnerable populations, ethics review committees, scientific integrity, research misconduct, conflict of interest, community engagement, and ethical considerations in implementation research and clinical trials.

UNIT IV: Human Rights, Equity and Social Justice in Public Health (12 Hours)

This unit explores health as a fundamental human right and examines international human rights instruments, including the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights. Students analyze health equity, gender equity, social justice, non-discrimination, indigenous health, disability rights, migrant health, refugee health, child rights, and ethical approaches to reducing health inequalities through inclusive public health policies.

UNIT V: Emerging Ethical and Legal Challenges in Public Health (10 Hours)

This unit addresses contemporary issues including ethics of artificial intelligence, digital health, big data, genomics, precision medicine, climate change, antimicrobial resistance, pandemic preparedness, mandatory vaccination, quarantine, resource allocation during public health emergencies, global health governance, and ethical leadership in public health. Students also explore future challenges in regulating rapidly evolving health technologies.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the ethical principles, legal frameworks, and human rights concepts underpinning public health practice.
- **CO2:** Interpret national and international public health laws and regulatory frameworks applicable to health systems and programmes.
- **CO3:** Analyze ethical issues in public health practice, research, surveillance, and emerging technologies using structured ethical reasoning.
- **CO4:** Evaluate public health policies and interventions through the lens of human rights, equity, and social justice.
- **CO5:** Apply ethical, legal, and human rights principles to develop responsible and equitable public health policies and programmes.

Recommended Learning Resources

Suggested Textbooks

1. Barrett DH, Ortmann LW, Dawson A, Saenz C, Reis A, Bolan G, editors. Public Health Ethics: Cases Spanning the Globe. Springer; 2016.
2. Gostin LO, Wiley LF. Public Health Law: Power, Duty, Restraint. 4th Edition. University of California Press; 2024.

Reference Books

1. Childress JF, Faden RR, Gaare RD, et al. Public Health Ethics: Mapping the Terrain. Journal of Law, Medicine & Ethics. 2002;30(2):170-178.
2. Beauchamp TL, Childress JF. Principles of Biomedical Ethics. 8th Edition. Oxford University Press; 2019.
3. World Health Organization. Guidance for Managing Ethical Issues in Infectious Disease Outbreaks. WHO; 2016.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-3: Health Protection; EPHF-8: Public Health Leadership and Governance; EPHF-10: Public Health Quality Assurance
ICAPHE Competency Framework	Domain VI: Public Health Ethics, Law, Human Rights, and Professionalism
SDG Mapping	SDG 3: Good Health and Well-being; SDG 5: Gender Equality; SDG 1 Reduced Inequalities; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This course provides comprehensive training in planning, conducting, and reporting systematic reviews and meta-analyses for evidence-informed public health practice. Students develop competencies in evidence synthesis, critical appraisal, quantitative data synthesis, and interpretation of research findings using internationally accepted methodological standards.

Course Objectives

- **CO1:** Explain the principles, methodology, and applications of systematic reviews and meta-analysis in public health research.
- **CO2:** Develop structured review questions, review protocols, and comprehensive literature search strategies.
- **CO3:** Critically appraise scientific evidence and assess the methodological quality and risk of bias of primary studies.
- **CO4:** Apply statistical methods for meta-analysis, heterogeneity assessment, publication bias evaluation, and evidence synthesis using specialized software.
- **CO5:** Prepare systematic review reports and evidence summaries following international reporting and methodological guidelines.

UNIT I: Foundations of Evidence Synthesis and Systematic Reviews**(10 Hours)**

This unit introduces evidence-based public health and the role of systematic reviews in research, policy, and clinical decision-making. Students examine the hierarchy of evidence, types of literature reviews, formulation of review questions using PICO, PECO, SPIDER, and SPICE frameworks, protocol development, registration in PROSPERO, and international methodological standards including PRISMA 2020, Cochrane Handbook, JBI Manual, and Campbell Collaboration guidance.

UNIT II: Literature Searching, Study Selection and Critical Appraisal**(14 Hours)**

This unit focuses on comprehensive literature searching across databases including PubMed/MEDLINE, Embase, Scopus, Web of Science, Cochrane Library, CINAHL, PsycINFO, and grey literature sources. Students learn search strategy development using Boolean operators and controlled vocabulary (MeSH/Emtree), citation management, screening procedures, duplicate removal, eligibility assessment, data extraction, and critical appraisal using tools such as CASP, AMSTAR 2, ROB 2, ROBINS-I, Newcastle-Ottawa Scale (NOS), and JBI Critical Appraisal Checklists.

UNIT III: Meta-Analysis and Statistical Methods**(14 Hours)**

This unit introduces statistical concepts and methods used in meta-analysis. Topics include effect size estimation, odds ratios, risk ratios, hazard ratios, mean differences, standardized mean differences, confidence intervals, fixed-effect and random-effects models, heterogeneity assessment (Q statistic, I^2 statistic, τ^2), subgroup analysis, sensitivity analysis, meta-regression, cumulative meta-analysis, network meta-analysis, and interpretation of forest plots. Students also learn software applications using RevMan, R (meta and metafor packages), JASP, and Comprehensive Meta-Analysis (CMA).

UNIT IV: Bias Assessment, Evidence Certainty and Reporting (12 Hours)

This unit examines methods for assessing publication bias using funnel plots, Egger's test, Begg's test, trim-and-fill analysis, and small-study effects. Students evaluate the certainty of evidence using the GRADE approach and learn transparent reporting through PRISMA 2020, PRISMA-S, PRISMA-ScR, MOOSE, and other reporting guidelines. The unit also covers reproducibility, research integrity, data sharing, open science practices, and ethical considerations in evidence synthesis.

UNIT V: Applications of Systematic Reviews in Public Health (10 Hours)

This unit explores the application of systematic reviews and meta-analysis in epidemiology, clinical medicine, health policy, health technology assessment, environmental health, implementation science, and global health. Students examine umbrella reviews, living systematic reviews, rapid reviews, scoping reviews, qualitative evidence synthesis, mixed-methods reviews, and the use of artificial intelligence in evidence synthesis. The unit concludes with future directions in evidence-informed public health and knowledge translation.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles and methodological foundations of systematic reviews and meta-analysis.
- **CO2:** Develop review protocols, conduct comprehensive literature searches, and critically appraise scientific evidence.
- **CO3:** Perform quantitative evidence synthesis and interpret meta-analytic findings using appropriate statistical methods and software.
- **CO4:** Assess methodological quality, publication bias, and certainty of evidence using internationally accepted frameworks.
- **CO5:** Prepare and report high-quality systematic reviews that support evidence-informed public health policy, practice, and research.

Recommended Learning Resources

Suggested Textbooks

1. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors. Cochrane Handbook for Systematic Reviews of Interventions. Version 6.5. Cochrane; 2024.
2. Gough D, Oliver S, Thomas J. An Introduction to Systematic Reviews. 3rd Edition. Sage Publications; 2025.

Reference Books

1. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. Introduction to Meta-Analysis. 2nd Edition. Wiley; 2021.
2. Aromataris E, Munn Z, editors. JBI Manual for Evidence Synthesis. Joanna Briggs Institute. Latest online edition.
3. Egger M, Davey Smith G, Altman DG, editors. Systematic Reviews in Health Research: Meta-Analysis in Context. 2nd Edition. BMJ Books; 2008.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-10: Quality Assurance in Public Health Services; EPHF-11: Public Health Research, Knowledge Management, and Innovation
ICAPHE Competency Framework	Evidence Synthesis, Research Methods, Critical Appraisal, and Knowledge Translation
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

26MPHT6511: PUBLIC HEALTH ENTREPRENEURSHIP & CONSULTING



L-T-P-C: 3-1-0-4

Delivery Mode: SWAYAM (NPTEL) with Faculty Mentoring and Assessment

Course Description

This course introduces the principles of entrepreneurship, innovation, and consulting in public health. It equips students with the knowledge and skills to identify public health challenges, develop innovative and sustainable solutions, prepare business and consulting proposals, and manage public health enterprises, social ventures, and consultancy projects.

Course Objectives

- **CO1:** Explain the concepts, principles, and ecosystem of entrepreneurship and consulting in public health.
- **CO2:** Examine innovation processes, business models, and social entrepreneurship for addressing public health challenges.
- **CO3:** Analyze market opportunities, healthcare enterprises, and consulting frameworks using evidence-based approaches.
- **CO4:** Develop business plans, consultancy proposals, financial models, and project management strategies for public health organizations.
- **CO5:** Evaluate ethical, legal, leadership, and sustainability considerations in public health entrepreneurship and consulting.

UNIT I: Foundations of Public Health Entrepreneurship

(10 Hours)

This unit introduces the concepts, scope, and significance of entrepreneurship in public health. Students explore entrepreneurial thinking, innovation ecosystems, design thinking, social entrepreneurship, intrapreneurship, public-private partnerships, startup ecosystems, and opportunities for innovation in healthcare, public health programmes, digital health, biotechnology, environmental health, and health services. The unit also discusses entrepreneurial competencies, leadership, and problem identification using systems thinking.

UNIT II: Innovation, Business Models and Healthcare Enterprises

(14 Hours)

This unit focuses on innovation management and business development in public health. Students examine business model generation using the Business Model Canvas, value proposition design, lean startup methodology, market analysis, customer discovery, product and service innovation, healthcare startups, social enterprises, intellectual property rights, technology transfer, incubation centres, accelerators, and sustainable business models for health-related enterprises.

UNIT III: Public Health Consulting and Project Management

(14 Hours)

This unit examines the principles and practices of public health consulting. Topics include consultancy processes, stakeholder analysis, needs assessment, proposal writing, terms of reference (ToR), consulting ethics, client relationship management, strategic planning, project design, budgeting, monitoring and evaluation, risk management, quality assurance, and report writing. Students also learn consulting methodologies used by international organizations, governments, NGOs, and healthcare institutions.

UNIT IV: Financial Planning, Leadership and Enterprise Management (12 Hours)

This unit explores financial management for public health enterprises, including budgeting, financial forecasting, pricing strategies, funding mechanisms, venture capital, grants, crowdfunding, impact investing, procurement, contract management, and financial sustainability. Students also examine leadership, negotiation, communication, team management, organizational development, legal compliance, corporate governance, and ethical decision-making in entrepreneurial and consulting environments.

UNIT V: Emerging Trends and Future Directions in Public Health Entrepreneurship (10 Hours)

This unit explores emerging opportunities in digital health entrepreneurship, artificial intelligence, precision public health, climate-smart innovations, health technology assessment, implementation science, global consulting, sustainable healthcare, health innovation ecosystems, impact measurement, and future workforce competencies. Students also examine successful public health enterprises, startup case studies, and strategies for scaling innovations that improve population health.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles of entrepreneurship, innovation, and consulting in public health.
- **CO2:** Analyze opportunities for developing innovative and sustainable public health enterprises.
- **CO3:** Develop consultancy proposals, business plans, and project management strategies for health organizations.
- **CO4:** Evaluate financial, managerial, ethical, and legal aspects of public health enterprises and consulting projects.
- **CO5:** Design entrepreneurial and consulting solutions that strengthen health systems, improve service delivery, and address complex public health challenges.

Recommended Learning Resources

Suggested Textbooks

1. Barringer BR, Ireland RD. Entrepreneurship: Successfully Launching New Ventures. 7th Edition. Pearson; 2024.
2. Osterwalder A, Pigneur Y. Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. Wiley; 2010.

Reference Books

1. Ries E. The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown Business; 2011.
2. Brown T. Change by Design: How Design Thinking Creates New Alternatives for Business and Society. Revised Edition. Harper Business; 2019.
3. Project Management Institute. A Guide to the Project Management Body of Knowledge (PMBOK® Guide). 7th Edition. PMI; 2021.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-9: Public Health Management, Leadership, Innovation, and Institutional Capacity Development
ICAPHE Competency Framework	Entrepreneurship, Innovation, Leadership, Consulting, Strategic Management, and Health Systems Strengthening
SDG Mapping	SDG 3: Good Health and Well-being; SDG 8: Decent Work and Economic Growth; SDG 9: Industry, Innovation and Infrastructure; SDG 11: Sustainable Cities and Communities; SDG 17: Partnerships for the Goals

26MPHL6503: PUBLIC HEALTH INFORMATICS LABORATORY

L-T-P-C: 0-0-2-2

Course Description

This laboratory course provides hands-on training in the use of digital technologies, health information systems, and data visualization tools for public health practice. Students develop practical competencies in managing digital health data, using health information platforms, creating dashboards, conducting spatial analysis, and applying digital solutions to support surveillance, programme management, and evidence-based decision-making.

Course Objectives

- **CO1:** Develop practical skills in using health information systems and digital health applications for public health programmes.
- **CO2:** Apply digital tools for data collection, management, visualization, and reporting.
- **CO3:** Demonstrate the use of geographic information systems (GIS), dashboards, and mobile health technologies for surveillance and programme monitoring.
- **CO4:** Apply principles of interoperability, data quality, privacy, and digital health standards in practical settings.
- **CO5:** Design and present digital public health solutions using contemporary informatics tools and technologies.

MODULE I: Digital Health Systems and Data Management

(10 Hours)

Students are introduced to commonly used public health informatics platforms and digital health systems.

Practical Exercises

- Introduction to Digital Health Ecosystem
- Electronic Health Records (EHR) and Electronic Medical Records (EMR)
- Hospital Information Systems (HIS)
- Health Management Information Systems (HMIS)
- Data import, validation, coding, and cleaning
- Data quality assessment
- Health data standards and interoperability concepts

MODULE II: Digital Data Collection and Health Information Systems

(14 Hours)

Students gain practical experience in digital data collection and management using field-based applications.

Practical Exercises

- Designing electronic questionnaires
- Mobile data collection using KoboToolbox or Open Data Kit (ODK)
- Data synchronization and cloud storage
- Disease surveillance data entry
- DHIS2 data management (demonstration/practice)
- Data export and reporting
- Basic health information system administration

MODULE III: Data Visualization, GIS and Decision Support

(16 Hours)

Students develop competencies in transforming health data into actionable information.

Practical Exercises

- Dashboard creation using Microsoft Power BI or Tableau Public

- Interactive charts and visualization
- Geographic Information Systems (GIS) using QGIS
- Disease mapping and hotspot analysis
- Spatial visualization of health indicators
- Trend analysis
- Public health reporting dashboards

MODULE IV: Digital Health Analytics and Emerging Technologies

(12 Hours)

Students explore advanced applications of digital technologies in public health.

Practical Exercises

- Introduction to Artificial Intelligence applications in public health
- Predictive analytics demonstrations
- Telemedicine workflow simulation
- Wearable health technologies
- Digital disease surveillance
- Public health data security and privacy exercises
- Case studies on Ayushman Bharat Digital Mission (ABDM)

MODULE V: Mini Project and Practical Applications

(8 Hours)

Students complete an individual or group digital health project by integrating knowledge acquired throughout the course.

Activities

- Develop a digital public health solution for a selected health problem
- Design an electronic data collection tool
- Perform data cleaning and analysis
- Develop GIS maps and interactive dashboards
- Prepare a digital surveillance report
- Present project findings through a technical presentation and demonstration

Course Outcomes

Upon successful completion of the laboratory, students will be able to:

- **CO1:** Operate health information systems and digital health applications used in public health programmes.
- **CO2:** Collect, manage, validate, and visualize digital health data using contemporary software tools.
- **CO3:** Apply GIS, dashboards, and mobile health technologies for disease surveillance and programme monitoring.
- **CO4:** Demonstrate ethical, secure, and interoperable management of digital health information.
- **CO5:** Develop practical digital health solutions to improve public health decision-making and service delivery.

Recommended Learning Resources

Suggested Textbooks

1. Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public Health Informatics and Information Systems. 3rd Edition. Springer; 2017.
2. Hoyt RE, Yoshihashi AK. Health Informatics: Practical Guide for Healthcare and Information Technology Professionals. 8th Edition. Lulu Press; 2023.

Reference Books

1. Shortliffe EH, Cimino JJ, editors. Biomedical Informatics: Computer Applications in Health Care and Biomedicine. 5th Edition. Springer; 2021.
2. World Health Organization. Global Strategy on Digital Health 2020-2025. WHO; 2021.
3. Government of India. Ayushman Bharat Digital Mission (ABDM): Health Data Management Policy and Operational Guidelines. Latest edition.

Laboratory Exercises

Students will complete practical exercises involving:

- Digital data collection using Kobo Toolbox/ODK
- Data import, coding, cleaning, and validation
- Health Management Information System (HMIS) data management
- DHIS2 data entry and reporting
- Electronic Health Record (EHR) demonstrations
- Dashboard creation using Power BI/Tableau
- GIS mapping using QGIS
- Disease surveillance and outbreak visualization
- Data privacy and cybersecurity case exercises
- Mini digital health project and presentation

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-1: Public Health Surveillance; EPHF-2: Monitoring and Evaluation; EPHF-6: Research and Knowledge Generation; EPHF-11: Information Systems and Knowledge Management
ICAPHE Competency Framework	Digital Health Applications, Health Information Systems, Data Analytics, and Public Health Informatics
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This seminar course develops advanced competencies in scientific communication, policy analysis, evidence synthesis, and professional presentation. Students critically appraise contemporary public health issues, translate scientific evidence into policy recommendations, and communicate research findings effectively to academic, professional, and policy audiences.

Course Objectives

- **CO1:** Develop skills in critically reviewing contemporary public health literature and policy documents.
- **CO2:** Strengthen competencies in scientific writing, evidence synthesis, and policy brief development.
- **CO3:** Enhance oral presentation, academic discussion, and professional communication skills.
- **CO4:** Apply evidence-based approaches to analyze emerging public health challenges and policy issues.
- **CO5:** Demonstrate leadership, teamwork, and ethical communication in academic and professional settings.

MODULE I: Scientific Literature Review and Journal Club**(6 Hours)**

Students learn the principles of scientific reading, literature appraisal, and evidence interpretation through structured journal club activities.

Activities

- Critical appraisal of peer-reviewed research articles
- Journal club presentations
- Discussion of study design and methodology
- Evaluation of scientific evidence
- Interpretation of research findings

MODULE II: Policy Analysis and Policy Brief Development**(8 Hours)**

Students analyze contemporary public health policies and translate scientific evidence into policy recommendations.

Activities

- Review of national and global public health policies
- Analysis of WHO, Ministry of Health, and government reports
- Writing concise policy briefs
- Stakeholder analysis
- Policy advocacy and evidence translation

MODULE III: Scientific Communication and Professional Presentation**(8 Hours)**

Students strengthen their oral and visual communication skills through professional presentations.

Activities

- Scientific presentation techniques

- Poster presentation
- PowerPoint design principles
- Conference-style oral presentations
- Audience engagement and scientific discussion
- Responding to questions and peer feedback

MODULE IV: Seminar Presentation and Reflection

(8 Hours)

Students independently prepare and deliver a seminar on an emerging public health topic, integrating evidence, policy implications, and practical recommendations.

Activities

- Selection of seminar topic
- Literature review and evidence synthesis
- Seminar presentation
- Peer review and faculty evaluation
- Reflective learning and professional feedback

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Critically appraise scientific literature and public health policy documents.
- **CO2:** Synthesize research evidence into clear scientific and policy communications.
- **CO3:** Deliver professional oral and poster presentations using effective scientific communication techniques.
- **CO4:** Develop concise policy briefs addressing priority public health issues.
- **CO5:** Demonstrate confidence, professionalism, leadership, and ethical communication in academic and public health settings.

Recommended Learning Resources

Suggested Textbooks

1. Matthews JR, Matthews RW. Successful Scientific Writing: A Step-by-Step Guide for the Biological and Medical Sciences. 5th Edition. Cambridge University Press; 2023.
2. Hofmann AH. Scientific Writing and Communication: Papers, Proposals, and Presentations. 4th Edition. Oxford University Press; 2024.

Reference Books

1. Coughlin SS. Scientific Writing and Communication in Public Health. Springer; 2018.
2. World Health Organization. Communicating Risk in Public Health Emergencies: A WHO Guideline for Emergency Risk Communication (ERC) Policy and Practice. WHO; 2018.
3. Brownson RC, Baker EA, Deshpande AD, Gillespie KN. Evidence-Based Public Health. 4th Edition. Oxford University Press; 2024.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-7: Public Health Workforce Development; EPHF-9: Leadership and Governance; EPHF-11: Knowledge Management, Research, and Innovation
ICAPHE Competency Framework	Policy Analysis, Scientific Communication, Evidence Translation, Leadership, and Professional Development
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnership for the Goals

26MPHT7501: ADVANCED RESEARCH METHODS & IMPLEMENTATION SCIENCE



L-T-P-C: 3-1-0-4

Course Description

This course provides advanced knowledge and practical approaches to public health research and implementation science. It equips students with competencies to design rigorous research studies, evaluate implementation strategies, translate evidence into practice, and strengthen health systems through implementation research and knowledge translation.

Course Objectives

- **CO1:** Explain advanced quantitative, qualitative, and mixed-methods research designs applicable to public health.
- **CO2:** Develop robust research protocols, implementation research frameworks, and evaluation strategies.
- **CO3:** Apply implementation science theories, frameworks, and methods to improve the adoption, scalability, and sustainability of public health interventions.
- **CO4:** Evaluate implementation outcomes using appropriate research methodologies, data collection techniques, and analytical approaches.
- **CO5:** Design evidence-informed implementation research projects that facilitate knowledge translation and health system strengthening.

Course Content

UNIT I: Advanced Public Health Research Designs

(10 Hours)

This unit introduces advanced research methodologies used in public health. Students examine experimental, quasi-experimental, pragmatic, adaptive, longitudinal, ecological, multicentre, community-based, and hybrid effectiveness-implementation study designs. The unit also covers mixed-methods research, participatory research approaches, realist evaluation, causal inference, protocol development, research governance, and reporting standards.

UNIT II: Implementation Science Frameworks and Theories

(14 Hours)

Comprehensive Qualitative Research Methods & Analysis - Theoretical foundations of qualitative research (Phenomenology, Grounded Theory, Ethnography). Qualitative data collection techniques: Focus Group Discussions (FGDs), In-Depth Interviews (IDIs), Key Informant Interviews (KIIs), and participatory observation. Qualitative sampling (purposive, theoretical, snowball). Data coding, thematic framework analysis, content analysis, and qualitative software application (NVivo/MAXQDA). Triangulation and trustworthiness criteria.

This unit explores the principles and foundations of implementation science. Students study implementation research frameworks including the Consolidated Framework for Implementation Research (CFIR), RE-AIM, Knowledge-to-Action (KTA) Framework, Normalization Process Theory (NPT), EPIS Framework (Exploration, Preparation, Implementation, Sustainment), Theoretical Domains Framework (TDF), and Behaviour Change Wheel (COM-B). Emphasis is placed on identifying implementation barriers, facilitators, stakeholder engagement, contextual adaptation, and scaling

evidence-based interventions.

UNIT III: Implementation Research Methods and Evaluation (14 Hours)

This unit focuses on implementation research methodologies and evaluation strategies. Topics include process evaluation, implementation fidelity, feasibility, acceptability, adoption, appropriateness, penetration, sustainability, implementation costing, hybrid effectiveness-implementation designs, quality improvement methods, health systems research, monitoring and evaluation, and pragmatic trial methodologies. Students also learn implementation outcome measurement and data collection approaches.

UNIT IV: Knowledge Translation, Dissemination and Research Impact (12 Hours)

This unit examines strategies for translating research evidence into policy and practice. Students explore knowledge translation models, evidence synthesis, stakeholder engagement, policy briefs, dissemination science, implementation partnerships, community engagement, implementation leadership, learning health systems, research utilization, open science, and measuring research impact using implementation indicators and knowledge translation frameworks.

UNIT V: Emerging Trends in Implementation Science and Global Health Research (10 Hours)

This unit explores emerging developments in implementation science, including digital implementation research, artificial intelligence, precision public health, adaptive implementation, systems thinking, implementation during public health emergencies, climate-resilient health systems, global implementation partnerships, equity-focused implementation research, and future directions in evidence-informed public health.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain advanced public health research methodologies and implementation science concepts.
- **CO2:** Develop scientifically rigorous research protocols using appropriate implementation science frameworks.
- **CO3:** Apply implementation research methods to evaluate the effectiveness, adoption, and sustainability of public health interventions.
- **CO4:** Design knowledge translation and dissemination strategies to bridge the gap between research and practice.
- **CO5:** Conduct implementation research that strengthens health systems and informs evidence-based public health policy and practice.

Recommended Learning Resources

Suggested Textbooks

1. Brownson RC, Proctor EK, Colditz GA, editors. Dissemination and Implementation Research in Health: Translating Science to Practice. 3rd Edition. Oxford University Press; 2025.
2. Peters DH, Tran NT, Adam T. Implementation Research in Health: A Practical Guide. World Health Organization; 2013.

Reference Books

1. Peters DH, Adam T, Alonge O, Agyepong IA, Tran NT. Implementation Research: What It Is and How to Do It. BMJ. 2013;347:f6753.
2. Nilsen P. Making Sense of Implementation Theories, Models and Frameworks. Implementation Science. 2015;10:53.
3. Creswell JW, Plano Clark VL. Designing and Conducting Mixed Methods Research. 4th Edition. Sage Publications; 2024.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-11: Public Health Research, Knowledge Management, Innovation, and Evidence-Informed Decision-Making
ICAPHE Competency Framework	Advanced Research Methods, Implementation Science, Knowledge Translation Programme Evaluation, and Health Systems Research
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This course develops leadership competencies and systems thinking approaches essential for strengthening public health systems and organizations. Students learn strategic leadership, organizational behaviour, governance, decision-making, complexity science, and systems thinking tools to address complex public health challenges through collaborative, adaptive, and evidence-informed leadership.

Course Objectives

- **CO1:** Explain the principles, theories, and practices of leadership and systems thinking in public health.
- **CO2:** Examine organizational behaviour, governance, strategic planning, and change management within health systems.
- **CO3:** Apply systems thinking tools to analyze complex public health problems and health system performance.
- **CO4:** Evaluate leadership approaches for crisis management, policy implementation, intersectoral collaboration, and health system resilience.
- **CO5:** Design innovative leadership strategies that strengthen public health programmes, organizations, and health systems.

UNIT I: Foundations of Public Health Leadership**(10 Hours)**

This unit introduces leadership concepts, theories, and competencies required in public health. Students examine leadership styles, emotional intelligence, transformational leadership, servant leadership, adaptive leadership, ethical leadership, professional values, communication, negotiation, conflict resolution, team building, and leadership development. The unit also explores leadership roles in national and global public health organizations.

UNIT II: Health Systems, Governance and Organizational Management**(14 Hours)**

This unit examines the structure and functioning of health systems using the WHO Health System Building Blocks framework. Students explore governance, stewardship, accountability, organizational behaviour, strategic planning, organizational culture, quality management, human resource leadership, health policy implementation, decentralization, intersectoral collaboration, and institutional capacity strengthening for effective health system performance.

UNIT III: Systems Thinking and Complexity in Public Health**(14 Hours)**

This unit introduces systems thinking as an approach to understanding complex public health challenges. Topics include systems science, complexity theory, causal loop diagrams, stock-and-flow models, systems mapping, feedback mechanisms, leverage points, adaptive systems, system dynamics, scenario planning, and application of systems thinking to communicable diseases, non-communicable diseases, climate change, health equity, and health system strengthening.

UNIT IV: Strategic Leadership, Change Management and Crisis Response (12 Hours)



This unit focuses on strategic leadership in dynamic public health environments. Students examine strategic decision-making, organizational change management, innovation management, project leadership, risk communication, emergency preparedness, disaster leadership, pandemic response, resilience building, stakeholder engagement, negotiation, advocacy, and leadership during public health emergencies. Practical case studies from national and global health programmes are included.

UNIT V: Emerging Trends and Future Leadership in Public Health (10 Hours)

This unit explores future directions in public health leadership, including digital leadership, artificial intelligence in decision-making, learning health systems, One Health leadership, climate-resilient health systems, global health diplomacy, leadership for sustainable development, diversity and inclusion, entrepreneurial leadership, and future workforce competencies required for resilient public health systems.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain leadership theories, governance principles, and systems thinking approaches relevant to public health.
- **CO2:** Analyze organizational performance and health system challenges using systems thinking tools.
- **CO3:** Apply strategic leadership and change management principles to strengthen public health programmes and organizations.
- **CO4:** Evaluate leadership strategies for health emergencies, policy implementation, and intersectoral collaboration.
- **CO5:** Design innovative and sustainable leadership solutions that improve health system resilience and population health outcomes.

Recommended Learning Resources

Suggested Textbooks

1. Johnson JK, Carayon P, editors. Health Systems Thinking: A Primer. Agency for Healthcare Research and Quality (AHRQ); 2023.
2. Northouse PG. Leadership: Theory and Practice. 10th Edition. Sage Publications; 2024.

Reference Books

1. Peter M. Senge. The Fifth Discipline: The Art and Practice of the Learning Organization. Revised and Updated Edition. Currency; 2006.
2. de Savigny D, Adam T, editors. Systems Thinking for Health Systems Strengthening. World Health Organization; 2009.
3. Heifetz RA, Grashow A, Linsky M. The Practice of Adaptive Leadership. Harvard Business Press; 2009.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-9: Public Health Leadership, Governance, Management, and Institutional Capacity Development
ICAPHE Competency Framework	Leadership, Governance, Systems Thinking, Strategic Management, Organizational Development, and Health System Strengthening
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 10: Reduced Inequalities; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

SPECIALIZATION TRACK I : EPIDEMIOLOGY & ANALYTICS

26MPHT7601: INFECTIOUS DISEASE EPIDEMIOLOGY

L-T-P-C: 3-0-0-3

Course Description

This elective course provides an advanced understanding of the epidemiology, prevention, surveillance, and control of infectious diseases of public health importance. Students develop competencies in investigating outbreaks, analyzing transmission dynamics, implementing evidence-based control strategies, and strengthening preparedness for emerging and re-emerging infectious diseases.

Course Objectives

- **CO1:** Explain the epidemiological principles, transmission dynamics, and determinants of infectious diseases.
- **CO2:** Examine surveillance systems, outbreak investigation methods, and laboratory-supported epidemiological approaches.
- **CO3:** Analyze prevention and control strategies for communicable diseases at local, national, and global levels.
- **CO4:** Evaluate emerging infectious diseases, antimicrobial resistance, and pandemic preparedness strategies.
- **CO5:** Design evidence-based interventions for infectious disease prevention, surveillance, and health system preparedness.

UNIT I: Foundations of Infectious Disease Epidemiology

(8 Hours)

This unit introduces the principles and scope of infectious disease epidemiology. Students examine the epidemiologic triad, chain of infection, host-agent-environment interactions, modes of transmission, natural history of infectious diseases, incubation period, herd immunity, reproductive numbers (R_0 and R_e), epidemic curves, and measures of disease occurrence. The unit also reviews the historical evolution of infectious disease control and global disease elimination initiatives.

UNIT II: Surveillance, Outbreak Investigation and Field Epidemiology

(10 Hours)

This unit focuses on communicable disease surveillance systems and field epidemiology. Topics include passive, active, sentinel, syndromic, and event-based surveillance; Integrated Disease Surveillance Programme (IDSP); International Health Regulations (IHR 2005); outbreak investigation steps; case definitions; contact tracing; epidemic intelligence; laboratory confirmation; field data collection; descriptive epidemiology; epidemic curve interpretation; and outbreak reporting.

UNIT III: Prevention and Control of Infectious Diseases

(10 Hours)

This unit examines evidence-based strategies for prevention and control of infectious diseases. Students learn immunization programmes, vaccine epidemiology, infection prevention and control (IPC), healthcare-associated infections, tuberculosis, HIV/AIDS, malaria, vector-borne diseases, neglected tropical diseases, zoonoses, One Health approach, environmental sanitation, antimicrobial stewardship, and community-based disease control interventions.

UNIT IV: Emerging and Re-emerging Infectious Diseases

(9 Hours)



This unit explores the epidemiology of emerging and re-emerging infectious diseases including COVID-19, influenza, Ebola virus disease, Nipah virus infection, dengue, chikungunya, mpox, antimicrobial resistance (AMR), climate-sensitive infectious diseases, and zoonotic spillover events. Students evaluate pandemic preparedness, risk assessment, genomic surveillance, emergency response systems, and global health security frameworks.

UNIT V: Advances in Infectious Disease Epidemiology

(8 Hours)

This unit introduces modern approaches to infectious disease epidemiology, including molecular epidemiology, genomic surveillance, mathematical modelling of disease transmission, digital disease surveillance, artificial intelligence in outbreak prediction, precision public health, implementation science for infectious disease control, and future challenges in achieving disease elimination and pandemic preparedness.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the epidemiological principles governing infectious disease transmission and control.
- **CO2:** Apply surveillance systems and outbreak investigation methods to detect and respond to infectious disease events.
- **CO3:** Evaluate prevention and control strategies for communicable diseases using evidence-based public health approaches.
- **CO4:** Assess emerging infectious disease threats, antimicrobial resistance, and pandemic preparedness strategies.
- **CO5:** Design comprehensive infectious disease surveillance and intervention programmes for population health protection.

Recommended Learning Resources

Suggested Textbooks

1. Nelson KE, Williams CM, editors. Infectious Disease Epidemiology: Theory and Practice. 4th Edition. Jones & Bartlett Learning; 2021.
2. Giesecke J. Modern Infectious Disease Epidemiology. 3rd Edition. CRC Press; 2017.

Reference Books

1. Heymann DL, editor. Control of Communicable Diseases Manual. 21st Edition. APHA Press; 2022.
2. Gordis L. Gordis Epidemiology. 7th Edition. Elsevier; 2024.
3. World Health Organization. International Health Regulations (2005). 3rd Edition. WHO; 2016.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-1: Public Health Surveillance; EPHF-2: Emergency Preparedness and Response; EPHF-3: Health Protection; EPHF-11: Public Health Research and Knowledge Management
ICAPHE Competency Framework	Advanced Epidemiology, Disease Surveillance, Outbreak Investigation, Infectious Disease Prevention and Control
SDG Mapping	SDG 3: Good Health and Well-being; SDG 6: Clean Water and Sanitation; SDG 13: Climate Action; SDG 17: Partnerships for the Goals

Course Description

This elective course provides advanced knowledge of environmental epidemiology, focusing on the relationship between environmental exposures and human health. Students develop competencies in assessing environmental risk factors, designing epidemiological studies, evaluating environmental health interventions, and applying evidence-based approaches to prevent environmentally related diseases.

Course Objectives

- **CO1:** Explain the principles, concepts, and scope of environmental epidemiology and exposure science.
- **CO2:** Examine the epidemiology of environmental exposures and their impact on population health.
- **CO3:** Analyze epidemiological methods for environmental health risk assessment and causal inference.
- **CO4:** Evaluate environmental health surveillance, regulatory policies, and intervention strategies.
- **CO5:** Design evidence-based approaches for environmental disease prevention and sustainable public health practice.

UNIT I: Foundations of Environmental Epidemiology**(8 Hours)**

This unit introduces the principles, scope, and evolution of environmental epidemiology. Students examine the interaction between environmental factors and human health, including exposure pathways, environmental determinants of health, ecological concepts, environmental justice, burden of environmentally related diseases, and the role of epidemiology in environmental risk assessment. The unit also discusses sustainable development and the One Health and Planetary Health approaches.

UNIT II: Environmental Exposures and Health Outcomes**(10 Hours)**

This unit examines major environmental exposures and their associated health effects. Topics include air pollution, water pollution, sanitation, soil contamination, hazardous chemicals, pesticides, heavy metals, radiation, occupational exposures, indoor air pollution, waste management, noise pollution, and climate-sensitive environmental hazards. Students analyze epidemiological evidence linking environmental exposures with respiratory diseases, cancers, cardiovascular diseases, neurological disorders, reproductive health outcomes, and childhood illnesses.

UNIT III: Methods in Environmental Epidemiology**(10 Hours)**

This unit focuses on epidemiological methods used in environmental health research. Students learn exposure assessment techniques, biomonitoring, environmental sampling, geographic information systems (GIS), remote sensing, environmental surveillance, environmental monitoring, spatial epidemiology, ecological studies, cohort and case-control studies, time-series analysis, causal inference, and quantitative environmental risk assessment.

UNIT IV: Climate Change, Disaster Epidemiology and Environmental Health Policy

(9 Hours)



This unit explores the public health implications of climate change and environmental degradation. Students examine heat-related illnesses, vector-borne diseases, extreme weather events, disaster epidemiology, environmental disasters, occupational climate risks, environmental migration, environmental health legislation, environmental impact assessment (EIA), pollution control policies, and national and international environmental health frameworks. The role of environmental governance in sustainable development is emphasized.

UNIT V: Emerging Issues in Environmental Epidemiology

(8 Hours)

This unit introduces emerging areas including planetary health, exposome research, environmental genomics, precision environmental health, antimicrobial resistance in the environment, microplastics, endocrine-disrupting chemicals, urban health, green infrastructure, artificial intelligence in environmental surveillance, environmental big data, and future directions in environmental epidemiology and sustainable public health.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles and applications of environmental epidemiology and exposure assessment.
- **CO2:** Analyze the epidemiological relationships between environmental exposures and population health outcomes.
- **CO3:** Apply environmental epidemiological methods and risk assessment techniques to investigate environmental health problems.
- **CO4:** Evaluate environmental health policies, surveillance systems, and interventions addressing environmental risks.
- **CO5:** Design evidence-based strategies for preventing environmentally related diseases and promoting sustainable public health.

Recommended Learning Resources

Suggested Textbooks

1. Baker D, Nieuwenhuijsen MJ. Environmental Epidemiology: Study Methods and Application. Oxford University Press; 2008.
2. Friis RH. Essentials of Environmental Health. 4th Edition. Jones & Bartlett Learning; 2024.

Reference Books

1. World Health Organization. Preventing Disease through Healthy Environments: A Global Assessment of the Burden of Disease from Environmental Risks. WHO.
2. World Health Organization. Air Quality Guidelines: Global Update. Latest Edition.
3. National Research Council. Human and Ecological Risk Assessment: Theory and Practice. National Academies Press.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-3: Health Protection; EPHF-4: Addressing Social and Environmental Determinants of Health; EPHF-11: Public Health Research and Knowledge Management
ICAPHE Competency Framework	Environmental Epidemiology, Environmental Health Risk Assessment, Exposure Science, Climate and Planetary Health
SDG Mapping	SDG 3: Good Health and Well-being; SDG 6: Clean Water and Sanitation; SDG 11: Sustainable Cities and Communities; SDG 13: Climate Action; SDG 15: Life on Land

Course Description

This elective course provides advanced knowledge of clinical trial methodology and implementation science for evaluating and translating evidence-based interventions into routine public health and healthcare practice. Students develop competencies in designing clinical trials, ensuring ethical conduct, analyzing implementation strategies, and strengthening health systems through evidence-informed implementation research.

Course Objectives

- **CO1:** Explain the principles, phases, and methodological foundations of clinical trials and implementation science.
- **CO2:** Design clinical trial protocols and implementation research studies using internationally accepted standards.
- **CO3:** Apply Good Clinical Practice (GCP), ethical principles, regulatory requirements, and data management strategies in clinical research.
- **CO4:** Evaluate implementation frameworks, process evaluations, and implementation outcomes for evidence-based interventions.
- **CO5:** Develop strategies for translating research findings into sustainable public health policy and practice.

UNIT I: Foundations of Clinical Trials**(8 Hours)**

This unit introduces the principles of clinical research and the evolution of clinical trials. Students examine phases of clinical trials (Phase I-IV), randomized controlled trials (RCTs), pragmatic trials, adaptive trial designs, cluster randomized trials, platform trials, protocol development, eligibility criteria, randomization, allocation concealment, blinding, outcome measurement, trial registration, and reporting standards including CONSORT.

UNIT II: Clinical Trial Operations, Ethics and Regulatory Affairs**(10 Hours)**

This unit focuses on the operational aspects of clinical trials. Topics include Good Clinical Practice (ICH-GCP), informed consent, ethics committee review, regulatory approvals, participant recruitment and retention, adverse event monitoring, pharmacovigilance, data management, quality assurance, trial monitoring, auditing, data safety monitoring boards (DSMBs), clinical trial documentation, and regulatory frameworks of CDSCO, ICMR, WHO, and international agencies.

UNIT III: Introduction to Implementation Science**(9 Hours)**

Qualitative Inquiry & Process Evaluation in Clinical Trials - Assessing patient acceptability, treatment adherence barriers, informed consent comprehension, and provider experiences using qualitative interviews and thematic analysis. This unit introduces implementation science as a bridge between research and practice. Students explore dissemination and implementation research, implementation frameworks including CFIR, RE-AIM, EPIS, Knowledge-to-Action (KTA), Behaviour Change Wheel

(COM-B), implementation strategies, stakeholder engagement, contextual adaptation, and implementation barriers and facilitators.

UNIT IV: Implementation Research and Evaluation

(10 Hours)

This unit examines implementation research methods used to evaluate evidence-based interventions. Topics include hybrid effectiveness-implementation designs, process evaluation, implementation fidelity, feasibility, acceptability, adoption, penetration, sustainability, implementation costing, monitoring and evaluation, knowledge translation, quality improvement, learning health systems, and implementation outcomes in public health programmes.

UNIT V: Emerging Trends in Clinical Trials and Implementation Science

(8 Hours)

This unit explores recent advances in clinical research and implementation science, including decentralized clinical trials, digital health technologies, artificial intelligence, real-world evidence, precision medicine, adaptive implementation, implementation during health emergencies, community-engaged research, implementation in low- and middle-income countries, and future directions for translating research into policy and practice.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles, methodology, and ethical foundations of clinical trials and implementation science.
- **CO2:** Design clinical trial protocols and implementation research studies using internationally accepted guidelines.
- **CO3:** Apply Good Clinical Practice, regulatory standards, and implementation frameworks to public health research.
- **CO4:** Evaluate implementation outcomes and translate evidence into effective health programmes and policies.
- **CO5:** Develop evidence-informed strategies for improving the adoption, scale-up, and sustainability of health interventions.

Recommended Learning Resources

Suggested Textbooks

1. Friedman LM, Furberg CD, DeMets DL, Reboussin DM, Granger CB. Fundamentals of Clinical Trials. 6th Edition. Springer; 2024.
2. Brownson RC, Proctor EK, Colditz GA, editors. Dissemination and Implementation Research in Health: Translating Science to Practice. 3rd Edition. Oxford University Press; 2025.

Reference Books

1. World Health Organization. Handbook for Good Clinical Research Practice (GCP): Guidance for Implementation. WHO.
2. International Council for Harmonisation (ICH). ICH E6(R3): Guideline for Good Clinical Practice. Latest version.
3. Indian Council of Medical Research (ICMR). National Ethical Guidelines for Biomedical and Health Research Involving Human Participants. 2024 Edition.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-10: Quality Assurance in Health Services; EPHF-11: Public Health Research, Knowledge Management, Innovation, and Evidence-Informed Decision-Making
ICAPHE Competency Framework	Clinical Research, Trial Management, Implementation Science, Programme Evaluation, and Knowledge Translation
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This elective course introduces the principles and applications of Spatial Epidemiology and Geographic Information Systems (GIS) in public health. Students develop competencies in spatial data management, disease mapping, spatial statistical analysis, remote sensing, and geospatial decision-making to investigate disease patterns, identify environmental risk factors, and support evidence-based public health planning.

Course Objectives

- **CO1:** Explain the principles of spatial epidemiology, geographic information systems, and spatial data science in public health.
- **CO2:** Apply GIS tools for disease mapping, spatial visualization, and health data management.
- **CO3:** Analyze spatial distribution, clustering, and environmental determinants of diseases using geospatial analytical methods.
- **CO4:** Evaluate the use of remote sensing, spatial modelling, and geostatistics in public health surveillance and programme planning.
- **CO5:** Design GIS-based solutions to support epidemiological investigations, health service planning, and evidence-informed public health decision-making.

UNIT I: Foundations of Spatial Epidemiology and GIS**(8 Hours)**

This unit introduces the concepts, history, and applications of spatial epidemiology and GIS. Students examine geographic concepts, coordinate systems, map projections, vector and raster data, spatial data models, geocoding, Global Positioning System (GPS), cartography, spatial databases, and the role of GIS in epidemiological investigations, disease surveillance, and health system planning.

UNIT II: Spatial Data Management and Disease Mapping**(10 Hours)**

This unit focuses on spatial data acquisition, management, and visualization. Topics include spatial data sources, census and demographic databases, health facility mapping, thematic mapping, choropleth maps, dot density maps, proportional symbol maps, georeferencing, spatial interpolation, dashboard development, web-based GIS, and visualization of communicable and non-communicable disease patterns.

UNIT III: Spatial Statistical Analysis and Geospatial Modelling**(10 Hours)**

This unit introduces statistical methods used in spatial epidemiology. Students explore spatial autocorrelation (Moran's I), hotspot analysis (Getis-Ord Gi*), cluster detection (SaTScan), kernel density estimation, spatial regression, Bayesian disease mapping, spatial interpolation, ecological analysis, spatio-temporal analysis, environmental exposure assessment, and geostatistical modelling for public health research.

UNIT IV: Remote Sensing, Environmental Applications and Public Health Surveillance (9 Hours)

This unit examines the integration of GIS and remote sensing in public health. Students learn satellite imagery interpretation, land-use and land-cover analysis, environmental monitoring, climate-sensitive disease surveillance, vector-borne disease mapping, disaster epidemiology, health accessibility analysis,

environmental exposure assessment, and applications of GIS in emergency preparedness and health resource allocation.

UNIT V: Emerging Technologies and Future Applications in Spatial Epidemiology (8 Hours)

This unit explores emerging advances in geospatial health, including artificial intelligence, machine learning, spatial big data, mobile GIS, drone technology, Internet of Things (IoT), digital disease surveillance, precision public health, smart cities, climate-resilient health systems, and future applications of geospatial technologies for health policy, programme implementation, and sustainable development.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles and applications of GIS and spatial epidemiology in public health.
- **CO2:** Develop and interpret disease maps and geospatial databases using GIS software.
- **CO3:** Apply spatial statistical techniques to investigate disease distribution, clustering, and environmental determinants.
- **CO4:** Evaluate geospatial technologies for surveillance, programme planning, and health system strengthening.
- **CO5:** Design GIS-supported public health interventions for disease prevention, resource allocation, and evidence-based decision-making.

Recommended Learning Resources

Suggested Textbooks

1. Cromley EK, McLafferty SL. GIS and Public Health. 3rd Edition. Guilford Press; 2024.
2. Elliott P, Wartenberg D, Wakefield J, Best N, Briggs D. Spatial Epidemiology: Methods and Applications. Oxford University Press.

Reference Books

1. Longley PA, Goodchild MF, Maguire DJ, Rhind DW. Geographic Information Systems and Science. 5th Edition. Wiley; 2024.
2. ESRI. GIS for Public Health. ESRI Press. Latest Edition.
3. QGIS Development Team. QGIS User Guide. Latest online documentation.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-1: Public Health Surveillance; EPHF-2: Monitoring and Evaluation; EPHF-11: Public Health Research, Knowledge Management, and Innovation
ICAPHE Competency Framework	Spatial Epidemiology, Geographic Information Systems (GIS), Geospatial Analytics, Environmental Health, and Disease Surveillance
SDG Mapping	SDG 3: Good Health and Well-being; SDG 9: Industry, Innovation and Infrastructure; SDG 11: Sustainable Cities and Communities; SDG 13: Climate Action; SDG 17: Partnerships for the Goals

Delivery Mode: SWAYAM (ICMR) with Faculty Mentoring and Assessment**Course Description**

This elective course introduces the applications of Artificial Intelligence (AI) and Machine Learning (ML) in public health. Students gain foundational knowledge of AI concepts, machine learning algorithms, predictive analytics, natural language processing, computer vision, and responsible AI while exploring their applications in disease surveillance, epidemiology, health systems, precision public health, and evidence-based decision-making.

Course Objectives

- **CO1:** Explain the fundamental concepts, methods, and applications of Artificial Intelligence and Machine Learning in public health.
- **CO2:** Examine machine learning algorithms and analytical techniques for health data analysis and prediction.
- **CO3:** Apply AI-driven approaches to disease surveillance, epidemiological modelling, health systems strengthening, and digital health.
- **CO4:** Evaluate ethical, legal, regulatory, and governance issues related to AI in healthcare and public health.
- **CO5:** Design evidence-informed AI solutions to address contemporary public health challenges while ensuring responsible and equitable implementation.

UNIT I: Foundations of Artificial Intelligence in Public Health**(8 Hours)**

This unit introduces the evolution, principles, and applications of Artificial Intelligence in healthcare and public health. Students examine AI terminology, machine learning, deep learning, data science, predictive analytics, precision public health, digital transformation, AI ecosystems, health data sources, and the role of AI in supporting evidence-based public health decision-making.

UNIT II: Machine Learning Methods and Health Data Analytics**(10 Hours)**

This unit focuses on supervised, unsupervised, semi-supervised, and reinforcement learning techniques. Topics include regression, classification, decision trees, random forests, support vector machines, clustering, neural networks, model training and validation, feature engineering, model evaluation, overfitting, bias-variance trade-off, and applications using structured and unstructured public health datasets.

UNIT III: AI Applications in Public Health and Healthcare**(10 Hours)**

This unit explores AI applications across public health domains, including disease surveillance, outbreak prediction, epidemiological modelling, medical imaging, clinical decision support systems, natural language processing, electronic health records, telemedicine, wearable technologies, health behaviour prediction, precision medicine, genomics, environmental health monitoring, and population health management.

UNIT IV: Ethics, Governance and Responsible AI

(9 Hours)



This unit examines ethical and regulatory considerations surrounding AI implementation.

Students study fairness, transparency, explainable AI (XAI), algorithmic bias, data privacy, cybersecurity, informed consent, responsible AI frameworks, health data governance, WHO guidance on AI ethics, regulatory considerations, intellectual property, and legal implications of AI-enabled healthcare systems.

UNIT V: Emerging Trends and Future Directions

(8 Hours)

This unit explores future developments including generative AI, foundation models, large language models (LLMs), federated learning, digital twins, AI-assisted implementation science, climate-health modelling, smart public health systems, One Health applications, Internet of Medical Things (IoMT), and the future workforce competencies required for AI-enabled public health practice.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles, techniques, and applications of Artificial Intelligence and Machine Learning in public health.
- **CO2:** Analyze health datasets using appropriate machine learning approaches and interpret predictive models.
- **CO3:** Evaluate AI applications for disease surveillance, health systems, epidemiology, and precision public health.
- **CO4:** Assess ethical, legal, governance, and equity considerations in AI-enabled healthcare and public health.
- **CO5:** Develop responsible AI-based solutions that improve public health programmes, research, and policy decision-making.

Recommended Learning Resources

Suggested Textbooks

1. Panch T, Mattie H, Celi LA. Artificial Intelligence for Healthcare: Opportunities and Challenges. CRC Press; 2024.
2. Géron A. Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow. 3rd Edition. O'Reilly Media; 2023.

Reference Books

1. World Health Organization. Ethics and Governance of Artificial Intelligence for Health. WHO; 2021.
2. World Health Organization. Global Strategy on Digital Health 2020-2025. WHO; 2021.
3. Russell SJ, Norvig P. Artificial Intelligence: A Modern Approach. 4th Edition. Pearson; 2021.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-6: Research and Knowledge Generation; EPHF-9: Leadership and Innovation; EPHF-11: Public Health Intelligence, Digital Transformation, and Knowledge Management
ICAPHE Competency Framework	Artificial Intelligence, Machine Learning, Digital Health, Data Science, Health Informatics, and Predictive Analytics
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 10: Reduced Inequalities; SDG 17: Partnerships for the Goals

26MPHT7606: CAUSAL INFERENCE & ADVANCED ANALYTICS



L-T-P-C: 2-1-0-3

Delivery Mode: SWAYAM (NPTEL) with Faculty Mentoring and Assessment

Course Description

This elective course introduces advanced analytical methods for causal inference and modern epidemiological data analysis. Students develop competencies in identifying causal relationships from observational and experimental data using statistical and computational approaches, enabling robust evidence generation for public health policy, programme evaluation, and implementation research.

Course Objectives

- **CO1:** Explain the principles of causal inference and advanced analytical methods used in public health research.
- **CO2:** Examine modern epidemiological frameworks for estimating causal effects using observational and experimental data.
- **CO3:** Apply advanced statistical techniques to address confounding, selection bias, and time-varying exposures.
- **CO4:** Evaluate causal models and analytical approaches for programme evaluation, implementation research, and policy analysis.
- **CO5:** Design evidence-based analytical strategies that strengthen causal interpretation and public health decision-making.

UNIT I: Foundations of Causal Inference

(8 Hours)

This unit introduces the conceptual foundations of causal inference. Students examine association versus causation, counterfactual theory, potential outcomes framework, causal diagrams, Directed Acyclic Graphs (DAGs), confounding, mediation, effect modification, collider bias, selection bias, Bradford Hill considerations, and the role of causal reasoning in epidemiology and public health research.

UNIT II: Advanced Methods for Observational Studies

(10 Hours)

This unit focuses on analytical approaches used to estimate causal effects from observational data. Topics include propensity score methods (matching, stratification, weighting), inverse probability weighting (IPW), instrumental variable analysis, regression discontinuity, difference-in-differences, interrupted time series, marginal structural models, g-methods, mediation analysis, and sensitivity analysis for unmeasured confounding.

UNIT III: Advanced Statistical and Machine Learning Approaches

(10 Hours)

This unit introduces modern analytical techniques used in public health. Students explore generalized linear models, mixed-effects models, Bayesian inference, survival analysis, longitudinal data analysis, high-dimensional data analysis, causal machine learning, targeted maximum likelihood estimation (TMLE), causal forests, ensemble learning, and the integration of artificial intelligence in causal analytics.

UNIT IV: Causal Inference in Public Health Policy and Implementation Research

(9 Hours)

This unit examines the application of causal inference in programme evaluation, health policy, implementation science, and comparative effectiveness research. Topics include natural experiments,

pragmatic trials, real-world evidence, health technology assessment, policy evaluation, implementation outcomes, health systems research, evidence synthesis, and translation of causal evidence into public health decision-making.

UNIT V: Emerging Trends and Future Directions in Advanced Analytics (8 Hours)

This unit explores contemporary developments including big data analytics, federated data analysis, precision public health, real-time epidemiology, artificial intelligence, explainable AI, reproducible research, open science, digital epidemiology, learning health systems, and future methodological innovations in causal inference and population health analytics.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the theoretical foundations and assumptions underlying causal inference.
- **CO2:** Apply advanced analytical methods to estimate causal relationships using observational and experimental data.
- **CO3:** Evaluate bias, confounding, and effect modification using appropriate causal frameworks and statistical techniques.
- **CO4:** Interpret causal evidence to support programme evaluation, implementation research, and health policy decisions.
- **CO5:** Design robust analytical strategies for generating evidence that informs public health practice and policy.

Recommended Learning Resources

Suggested Textbooks

1. Hernán MA, Robins JM. Causal Inference: What If. Chapman & Hall/CRC; 2024 (Open Access Edition).
2. Cunningham S. Causal Inference: The Mixtape. Yale University Press; 2021.

Reference Books

1. Pearl J, Glymour M, Jewell NP. Causal Inference in Statistics: A Primer. Wiley; 2016.
2. Imbens GW, Rubin DB. Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction. Cambridge University Press; 2015.
3. VanderWeele TJ. Explanation in Causal Inference: Methods for Mediation and Interaction. Oxford University Press; 2015.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-6: Public Health Research and Knowledge Generation; EPHF-10: Quality Assurance and Evaluation; EPHF-11: Knowledge Management, Innovation, and Evidence-Informed Decision-Making
ICAPHE Competency Framework	Advanced Epidemiology, Causal Inference, Biostatistics, Advanced Analytics, Programme Evaluation, and Research Methods
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This elective course introduces the emerging field of Digital Epidemiology, which utilizes digital data sources, computational methods, and innovative technologies to monitor, predict, and respond to population health events. Students develop competencies in digital surveillance, big data analytics, mobile health, social media analytics, digital disease detection, and real-time epidemiological intelligence for evidence-informed public health decision-making.

Course Objectives

- **CO1:** Explain the principles, concepts, and applications of digital epidemiology in modern public health.
- **CO2:** Examine digital data sources and computational methods used for disease surveillance and epidemiological research.
- **CO3:** Apply digital technologies, artificial intelligence, and big data analytics to monitor disease patterns and public health emergencies.
- **CO4:** Evaluate ethical, legal, governance, and data privacy issues associated with digital epidemiology.
- **CO5:** Design digital epidemiological approaches that strengthen surveillance systems, outbreak preparedness, and public health policy.

UNIT I: Foundations of Digital Epidemiology**(8 Hours)**

This unit introduces the evolution, scope, and principles of digital epidemiology. Students examine traditional versus digital epidemiology, digital transformation of public health, digital health ecosystems, digital surveillance, public health informatics, precision public health, digital data streams, and the role of computational epidemiology in improving population health.

UNIT II: Digital Data Sources and Surveillance Systems**(10 Hours)**

This unit focuses on digital sources of epidemiological data, including electronic health records (EHRs), health management information systems (HMIS), electronic laboratory reporting, social media platforms, internet search queries, wearable devices, mobile applications, participatory surveillance, syndromic surveillance, digital contact tracing, genomics, environmental sensors, and Internet of Things (IoT)-enabled health systems. Students also examine digital disease surveillance platforms and integrated surveillance architectures.

UNIT III: Big Data Analytics, Artificial Intelligence and Predictive Epidemiology **(10 Hours)**

This unit explores computational approaches used in digital epidemiology. Topics include big data analytics, machine learning, artificial intelligence, natural language processing, predictive modelling, outbreak forecasting, geospatial analytics, network analysis, real-time dashboards, digital twin technologies, and decision-support systems for disease prevention, surveillance, and emergency response.

UNIT IV: Ethics, Governance and Digital Health Security

(9 Hours)



This unit examines ethical, legal, and governance issues in digital epidemiology. Students study data governance, privacy protection, cybersecurity, informed consent, algorithmic bias, explainable artificial intelligence, digital equity, misinformation and infodemics, regulatory frameworks, WHO digital health guidance, and responsible use of digital technologies in public health.

UNIT V: Emerging Trends and Future Directions

(8 Hours)

This unit explores future developments in digital epidemiology, including precision public health, genomic epidemiology, climate-informed surveillance, digital One Health, blockchain applications, federated learning, digital public health intelligence, pandemic preparedness, smart cities, learning health systems, and the competencies required for the future digital public health workforce.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the concepts, principles, and applications of digital epidemiology in public health.
- **CO2:** Analyze digital data sources and surveillance systems used for epidemiological intelligence.
- **CO3:** Apply computational methods, artificial intelligence, and digital technologies to disease surveillance and outbreak prediction.
- **CO4:** Evaluate ethical, governance, and data privacy considerations in digital public health.
- **CO5:** Design digital epidemiological strategies that support evidence-based surveillance, preparedness, and public health decision-making.

Recommended Learning Resources

Suggested Textbooks

1. Salathé M, editor. Digital Epidemiology. Springer Nature; 2019.
2. Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public Health Informatics and Information Systems. 3rd Edition. Springer; 2017.

Reference Books

1. World Health Organization. Global Strategy on Digital Health 2020-2025. WHO; 2021.
2. World Health Organization. Ethics and Governance of Artificial Intelligence for Health. WHO; 2021.
3. Eysenbach G. Infodemiology and Infoveillance: Framework for Public Health Informatics Research. Journal of Medical Internet Research. 2009.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-1: Public Health Surveillance; EPHF-2: Monitoring and Evaluation; EPHF-6: Research and Knowledge Generation; EPHF-11: Digital Health Information Systems, and Knowledge Management
ICAPHE Competency Framework	Digital Epidemiology, Public Health Informatics, Digital Surveillance, Artificial Intelligence, Data Analytics, and Digital Health
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This elective course provides advanced knowledge of healthcare operations and supply chain management in public health and healthcare systems. Students develop competencies in planning, procurement, logistics, inventory management, quality improvement, healthcare operations, and resilient supply chain systems to ensure efficient, equitable, and uninterrupted delivery of health services and essential medical commodities.

Course Objectives

- **CO1:** Explain the principles and components of healthcare operations and supply chain management.
- **CO2:** Examine procurement systems, logistics, inventory control, and healthcare operations for effective service delivery.
- **CO3:** Apply quantitative and analytical tools to improve healthcare operational efficiency and supply chain performance.
- **CO4:** Evaluate quality management, risk mitigation, digital technologies, and resilience strategies in healthcare supply chains.
- **CO5:** Design sustainable and evidence-based operational and supply chain solutions for healthcare organizations and public health programmes.

UNIT I: Foundations of Healthcare Operations and Supply Chain Management (8 Hours)

This unit introduces healthcare operations and supply chain management within health systems. Students examine healthcare delivery processes, operational planning, supply chain components, procurement cycles, demand forecasting, warehousing, logistics, distribution systems, value chains, healthcare commodities, pharmaceutical supply systems, cold chain management, and performance indicators for healthcare operations.

UNIT II: Procurement, Inventory and Logistics Management (10 Hours)

This unit focuses on procurement and logistics systems used in healthcare organizations. Topics include strategic sourcing, vendor management, contract management, inventory management techniques (ABC, VED, EOQ, FSN analyses), warehouse management, transportation systems, cold chain logistics, vaccine logistics, essential medicines supply, emergency procurement, reverse logistics, and healthcare waste management.

UNIT III: Quality Improvement and Healthcare Operations Management (10 Hours)

This unit examines operational excellence in healthcare organizations. Students explore Lean Healthcare, Six Sigma, Total Quality Management (TQM), process mapping, workflow optimization, capacity planning, queue management, scheduling, patient flow management, healthcare performance measurement, accreditation standards, quality indicators, and continuous quality improvement methodologies.

UNIT IV: Digital Health Supply Chains and Risk Management

(9 Hours)



This unit focuses on digital transformation and resilience in healthcare supply chains. Topics include Enterprise Resource Planning (ERP), Hospital Information Systems (HIS), electronic logistics management information systems (eLMIS), RFID, barcode technologies, blockchain, artificial intelligence, predictive analytics, supply chain visibility, cybersecurity, disaster logistics, humanitarian supply chains, business continuity planning, and supply chain risk management.

UNIT V: Emerging Trends and Sustainable Healthcare Operations

(8 Hours)

This unit explores future directions in healthcare operations, including green healthcare supply chains, sustainable procurement, circular economy principles, climate-resilient logistics, value-based healthcare, precision logistics, drone-assisted delivery, autonomous transportation, Internet of Medical Things (IoMT), healthcare innovation, and strategic operations for resilient health systems.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain healthcare operations and supply chain management principles applicable to healthcare organizations and public health programmes.
- **CO2:** Apply procurement, inventory, and logistics management techniques to improve healthcare service delivery.
- **CO3:** Evaluate operational performance using quality improvement and process optimization methodologies.
- **CO4:** Assess digital technologies and risk management strategies for resilient healthcare supply chains.
- **CO5:** Design sustainable healthcare operations and supply chain strategies that strengthen health system performance.

Recommended Learning Resources

Suggested Textbooks

1. Langabeer JR II. Health Care Operations Management: A Systems Perspective. 3rd Edition. Jones & Bartlett Learning; 2022.
2. Ozcan YA. Quantitative Methods in Health Care Management: Techniques and Applications. 3rd Edition. Jossey-Bass; 2023.

Reference Books

1. World Health Organization. Operational Principles for Good Pharmaceutical Procurement. WHO.
2. World Health Organization. Guidelines on the International Packaging and Shipping of Vaccines. Latest Edition.
3. Management Sciences for Health (MSH). MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: MSH; Latest Edition.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-8: Assuring Equitable Access to Essential Health Services; EPHF-9: Leadership, Governance, and Management; EPHF-10: Quality Assurance in Health Services
ICAPHE Competency Framework	Healthcare Operations Management, Supply Chain Management, Health Systems, Logistics, Quality Improvement, and Health Service Administration
SDG Mapping	SDG 3: Good Health and Well-being; SDG 9: Industry, Innovation and Infrastructure; SDG 12: Responsible Consumption and Production; SDG 17: Partnerships for the Goals

Course Description

This elective course provides advanced knowledge of health policy analysis, policy formulation, implementation, and evaluation within national and global health systems. Students develop competencies in analyzing health policies using evidence-informed frameworks, assessing stakeholder interests, evaluating policy impacts, and designing strategic policy recommendations to improve population health and health system performance.

Course Objectives

- **CO1:** Explain the principles, theories, and processes of health policy development and analysis.
- **CO2:** Examine policy formulation, implementation, governance, and stakeholder engagement in health systems.
- **CO3:** Apply analytical frameworks and economic, political, and legal perspectives to evaluate health policies.
- **CO4:** Assess the impact of health policies on equity, health outcomes, financing, and health system performance.
- **CO5:** Develop evidence-informed policy recommendations for addressing contemporary public health challenges.

Course Content (45 Hours)**UNIT I: Foundations of Health Policy and Policy Analysis****(8 Hours)**

This unit introduces the concepts, scope, and evolution of health policy. Students examine policy cycles, agenda setting, policy formulation, implementation, monitoring, evaluation, governance, health systems thinking, policy actors, institutions, stakeholder analysis, political economy of health, and major theoretical models including Kingdon's Multiple Streams Framework, Walt and Gilson's Policy Triangle, and the Advocacy Coalition Framework.

UNIT II: Health Policy Formulation and Governance**(10 Hours)**

This unit focuses on policy development within national and international health systems. Topics include evidence-informed policymaking, health legislation, constitutional provisions for health, decentralization, federalism, intersectoral governance, regulatory systems, public-private partnerships, global health governance, Universal Health Coverage (UHC), Sustainable Development Goals (SDGs), and the policy roles of WHO, World Bank, UNICEF, and national governments.

UNIT III: Health Policy Evaluation and Economic Analysis**(10 Hours)**

This unit examines methods used to evaluate health policies. Students learn policy appraisal techniques, health impact assessment, economic evaluation, cost-effectiveness analysis, budget impact analysis, programme evaluation, equity assessment, implementation analysis, policy monitoring indicators, health financing reforms, and evaluation of major national and international health policies.

UNIT IV: Contemporary Health Policy Challenges**(9 Hours)**

This unit explores policy responses to emerging public health issues including pandemic preparedness,

antimicrobial resistance, climate change, digital health governance, health workforce shortages, ageing populations, non-communicable diseases, mental health, pharmaceutical regulation, health insurance reforms, emergency preparedness, and health equity. Students critically analyze selected national and global policy case studies.

UNIT V: Strategic Policy Leadership and Future Directions (8 Hours)

This unit focuses on leadership for health policy development and implementation. Topics include strategic policy communication, policy advocacy, negotiation, diplomacy, policy entrepreneurship, systems leadership, implementation science, policy innovation, foresight analysis, artificial intelligence in policymaking, and future directions in health governance and public health policy.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain theories, processes, and frameworks used in health policy analysis.
- **CO2:** Analyze health policies using evidence-informed, political, economic, and systems perspectives.
- **CO3:** Evaluate policy implementation, governance, financing, and health system performance.
- **CO4:** Assess the impact of health policies on equity, population health, and sustainable development.
- **CO5:** Develop strategic policy recommendations to address complex public health challenges at national and global levels.

Recommended Learning Resources

Suggested Textbooks

1. Buse K, Mays N, Walt G. Making Health Policy. 3rd Edition. McGraw-Hill Education/Open University Press; 2024.
2. Gilson L. Health Policy and Systems Research: A Methodology Reader. World Health Organization & Alliance for Health Policy and Systems Research; Updated Edition.

Reference Books

1. World Health Organization. Health in All Policies (HiAP): Framework for Country Action. WHO; 2014.
2. Walt G. Health Policy: An Introduction to Process and Power. Zed Books; 1994.
3. World Health Organization. World Health Report (Latest Edition).

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-3: Health Protection and Governance; EPHF-4: Addressing Social Determinants of Health; EPHF-9: Leadership, Governance, and Management; EPHF-11: Evidence-Informed Policy Development
ICAPHE Competency Framework	Health Policy Analysis, Health Systems Governance, Policy Evaluation, Leadership, and Public Health Management
SDG Mapping	SDG 3: Good Health and Well-being; SDG 10: Reduced Inequalities; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

Course Description

This elective course provides comprehensive knowledge of health insurance systems, healthcare financing mechanisms, and managed care models. Students develop competencies in health insurance design, risk pooling, provider payment systems, claims management, quality assurance, and health financing reforms to improve financial protection, equitable access, and efficiency within healthcare systems.

Course Objectives

- **CO1:** Explain the principles, concepts, and evolution of health insurance and managed care systems.
- **CO2:** Examine public and private health insurance models, financing mechanisms, and provider payment systems.
- **CO3:** Apply actuarial and economic principles to evaluate insurance programmes and managed care organizations.
- **CO4:** Analyze health insurance policies, claims management, fraud control, quality assurance, and regulatory frameworks.
- **CO5:** Design evidence-based health insurance strategies that promote Universal Health Coverage (UHC), financial risk protection, and sustainable healthcare financing.

UNIT I: Foundations of Health Insurance and Healthcare Financing (8 Hours)

This unit introduces the concepts, evolution, and principles of health insurance. Students examine risk pooling, adverse selection, moral hazard, underwriting, insurance markets, healthcare financing models, financial protection, Universal Health Coverage (UHC), social health insurance, private insurance, community-based health insurance, employer-sponsored insurance, and health financing reforms.

UNIT II: Health Insurance Models and Managed Care Systems (10 Hours)

This unit focuses on health insurance systems and managed care organizations. Topics include indemnity insurance, managed care principles, Health Maintenance Organizations (HMOs), Preferred Provider Organizations (PPOs), Accountable Care Organizations (ACOs), integrated care models, provider networks, gatekeeping, referral systems, capitation, bundled payments, Diagnosis Related Groups (DRGs), pay-for-performance, and value-based healthcare.

UNIT III: Insurance Operations, Claims and Quality Management (10 Hours)

This unit examines operational aspects of health insurance. Students learn enrolment systems, premium calculation, benefit package design, claims processing, fraud detection, utilization review, medical auditing, reimbursement mechanisms, third-party administrators (TPAs), digital claims management, quality assurance, accreditation standards, patient satisfaction, grievance redressal, and insurance information systems.

UNIT IV: Health Insurance Policy, Regulation and National Programmes (9 Hours)

This unit explores health insurance governance and regulatory frameworks. Topics include health insurance legislation, insurance regulation, Insurance Regulatory and Development Authority of India

(IRDAI), Ayushman Bharat -Pradhan Mantri Jan Arogya Yojana (PM-JAY), Employees' State Insurance (ESI), Central Government Health Scheme (CGHS), state insurance schemes, global insurance models, equity, affordability, and health system reforms.

UNIT V: Emerging Trends and Future Directions in Health Insurance (8 Hours)

This unit examines future developments including digital insurance ecosystems, artificial intelligence in claims management, blockchain, telehealth reimbursement, predictive analytics, personalized insurance products, climate-related health financing, sustainable insurance models, health technology assessment (HTA), strategic purchasing, and innovations supporting Universal Health Coverage.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles and financing mechanisms of health insurance and managed care.
- **CO2:** Analyze insurance models, provider payment systems, and managed care organizations.
- **CO3:** Evaluate insurance operations, claims management, fraud prevention, and quality assurance systems.
- **CO4:** Assess national and international health insurance policies, regulations, and financing reforms.
- **CO5:** Develop evidence-based health insurance strategies that enhance financial protection, service quality, and health system efficiency.

Recommended Learning Resources

Suggested Textbooks

1. Feldstein PJ. Health Care Economics. 9th Edition. Cengage Learning; 2024.
2. Shi L, Singh DA. Delivering Health Care in America: A Systems Approach. 9th Edition. Jones & Bartlett Learning; 2025.

Reference Books

1. Mossialos E, Dixon A, Figueras J, Kutzin J, editors. Funding Health Care: Options for Europe. Open University Press.
2. World Health Organization. The World Health Report: Health Systems Financing -The Path to Universal Coverage. WHO; 2010.
3. Kutzin J, Cashin C, Jakab M, editors. Implementing Health Financing Reform: Lessons from Countries in Transition. WHO Regional Office for Europe.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-8: Assuring Equitable Access to Essential Health Services; EPHF-9: Leadership, Governance, and Management; EPHF-10: Quality Assurance in Health Services
ICAPHE Competency Framework	Health Financing, Health Insurance, Managed Care, Health System Management, Strategic Purchasing, and Healthcare Administration
SDG Mapping	SDG 3: Good Health and Well-being; SDG 1: No Poverty; SDG 10: Reduced Inequalities; SDG 16: Peace, Justice and Strong Institutions

Course Description

This elective course provides comprehensive knowledge of disaster risk reduction, emergency preparedness, and public health emergency management. Students develop competencies in disaster epidemiology, emergency response systems, incident management, humanitarian health, risk communication, and resilient health system planning to effectively prepare for, respond to, and recover from natural, biological, technological, and humanitarian disasters.

Course Objectives

- **CO1:** Explain the principles, concepts, and frameworks of disaster and health emergency management.
- **CO2:** Examine disaster risk assessment, preparedness planning, emergency response systems, and humanitarian health interventions.
- **CO3:** Apply disaster epidemiology, surveillance, and incident management approaches during public health emergencies.
- **CO4:** Evaluate disaster governance, health system resilience, and international emergency response mechanisms.
- **CO5:** Design evidence-based disaster preparedness and emergency management strategies for resilient health systems and communities.

UNIT I: Foundations of Disaster and Health Emergency Management**(8 Hours)**

This unit introduces disaster concepts, classifications, and public health impacts. Students examine natural, biological, technological, chemical, radiological, and nuclear disasters; disaster risk reduction; vulnerability and capacity assessment; Sendai Framework for Disaster Risk Reduction; disaster management cycle; health emergency preparedness; climate-related disasters; and the role of public health agencies in disaster management.

UNIT II: Disaster Preparedness, Emergency Response and Incident Management (10 Hours)

This unit focuses on preparedness and emergency response systems. Topics include emergency operations planning, Incident Command System (ICS), Emergency Operations Centres (EOCs), hospital emergency preparedness, mass casualty management, emergency medical services, logistics management, emergency supply chains, rapid needs assessment, emergency surveillance, coordination mechanisms, and simulation exercises.

UNIT III: Disaster Epidemiology and Humanitarian Public Health**(10 Hours)**

This unit examines epidemiological methods used during disasters and humanitarian crises. Students learn rapid epidemiological assessment, outbreak investigation, communicable disease surveillance in emergencies, nutrition assessment, Water, Sanitation and Hygiene (WASH), shelter health, reproductive and maternal health, mental health and psychosocial support (MHPSS), refugee health, internally displaced populations, and Sphere Humanitarian Standards.

UNIT IV: Disaster Governance, Risk Communication and Recovery

(9 Hours)



This unit explores disaster governance and recovery strategies. Topics include disaster legislation, India's Disaster Management Act, National Disaster Management Authority (NDMA), International Health Regulations (IHR 2005), WHO Health Emergency Programme, emergency risk communication, community engagement, media management, business continuity planning, recovery, rehabilitation, reconstruction, resilience building, and lessons learned from major disasters and pandemics.

UNIT V: Emerging Challenges and Future Directions (8 Hours)

This unit examines contemporary issues including pandemic preparedness, One Health emergencies, antimicrobial resistance, climate-resilient health systems, artificial intelligence in emergency management, digital emergency surveillance, drones in disaster response, early warning systems, humanitarian innovation, disaster informatics, and future competencies required for public health emergency preparedness and response.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain disaster management principles, emergency preparedness frameworks, and health emergency systems.
- **CO2:** Apply disaster epidemiology, surveillance, and incident management approaches during public health emergencies.
- **CO3:** Evaluate humanitarian response strategies, emergency logistics, and health system resilience.
- **CO4:** Assess disaster governance, emergency communication, and recovery frameworks at national and international levels.
- **CO5:** Develop comprehensive disaster preparedness and emergency response plans for communities and healthcare systems.

Recommended Learning Resources

Suggested Textbooks

1. Noji EK, editor. The Public Health Consequences of Disasters. Oxford University Press.
2. World Health Organization. Health Emergency and Disaster Risk Management (Health EDRM) Framework. WHO; 2019.

Reference Books

1. Coppola DP. Introduction to International Disaster Management. 4th Edition. Butterworth-Heinemann; 2020.
2. Haddow GD, Bullock JA, Coppola DP. Introduction to Emergency Management. 7th Edition. Butterworth-Heinemann; 2023.
3. Government of India. Disaster Management Act, 2005 and National Disaster Management Guidelines. National Disaster Management Authority (NDMA); Latest Editions.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-2: Emergency Preparedness and Response; EPHF-3: Health Protection; EPHF-9: Leadership, Governance, and Management
ICAPHE Competency Framework	Disaster Risk Reduction, Emergency Preparedness, Disaster Epidemiology, Humanitarian Health, and Health Systems Resilience
SDG Mapping	SDG 3: Good Health and Well-being; SDG 11: Sustainable Cities and Communities; SDG 13: Climate Action; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

26MPHT7612: HEALTHCARE QUALITY, ACCREDITATION & NABH



L-T-P-C: 2-1-0-3

Delivery Mode: SWAYAM (NPTEL) with Faculty Mentoring and Assessment

Course Description

This elective course provides comprehensive knowledge of healthcare quality management, patient safety, accreditation systems, and quality improvement methodologies. Students develop competencies in implementing quality management systems, interpreting National Accreditation Board for Hospitals & Healthcare Providers (NABH) standards, applying continuous quality improvement tools, and fostering a culture of patient safety and organizational excellence in healthcare institutions.

Course Objectives

- **CO1:** Explain the principles, concepts, and frameworks of healthcare quality and patient safety.
- **CO2:** Examine national and international accreditation standards, including NABH and other quality frameworks.
- **CO3:** Apply quality improvement methodologies, performance indicators, and patient safety tools in healthcare organizations.
- **CO4:** Evaluate healthcare quality management systems, accreditation processes, clinical governance, and risk management.
- **CO5:** Design sustainable quality improvement initiatives that enhance healthcare outcomes, organizational performance, and patient satisfaction.

UNIT I: Foundations of Healthcare Quality and Patient Safety

(8 Hours)

This unit introduces the evolution, principles, and dimensions of healthcare quality. Students examine quality of care, patient-centered care, quality assurance, quality improvement, clinical governance, Donabedian's Structure-Process-Outcome model, Institute of Medicine's six dimensions of quality, patient safety culture, adverse events, medical errors, and the WHO Global Patient Safety Action Plan.

UNIT II: Healthcare Accreditation and NABH Standards

(10 Hours)

This unit focuses on accreditation systems and quality standards. Topics include the philosophy and benefits of accreditation, NABH accreditation standards, Joint Commission International (JCI), ISO 9001 Quality Management Systems, accreditation process, hospital committees, documentation, standard operating procedures (SOPs), quality manuals, internal audits, gap analysis, compliance monitoring, and accreditation readiness.

UNIT III: Quality Improvement Methodologies and Performance Measurement

(10 Hours)

This unit examines evidence-based quality improvement tools and methodologies. Students learn Plan-Do-Study-Act (PDSA) cycles, Lean Healthcare, Six Sigma, Root Cause Analysis (RCA), Failure Mode and Effects Analysis (FMEA), clinical audits, Key Performance Indicators (KPIs), benchmarking, dashboard development, balanced scorecards, quality indicators, and healthcare performance measurement.

UNIT IV: Risk Management, Infection Prevention and Patient Safety

(9



Hours)

This unit explores patient safety systems and organizational risk management. Topics include infection prevention and control (IPC), medication safety, incident reporting systems, sentinel event management, healthcare-associated infections (HAIs), biomedical waste management, occupational safety, emergency preparedness, patient rights, ethical practice, legal aspects of quality, and organizational learning from adverse events.

UNIT V: Emerging Trends in Healthcare Quality and Accreditation

(8 Hours)

This unit examines future developments in healthcare quality, including digital quality management systems, artificial intelligence for quality improvement, electronic quality dashboards, accreditation in telemedicine, value-based healthcare, patient-reported outcome measures (PROMs), patient-reported experience measures (PREMs), smart hospitals, sustainability in healthcare quality, and future accreditation models.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain healthcare quality principles, patient safety concepts, and accreditation frameworks.
- **CO2:** Apply NABH standards and quality management systems to healthcare organizations.
- **CO3:** Evaluate quality indicators and implement continuous quality improvement methodologies.
- **CO4:** Assess patient safety programmes, risk management systems, and clinical governance practices.
- **CO5:** Design sustainable quality improvement and accreditation strategies that enhance organizational excellence and patient outcomes.

Recommended Learning Resources

Suggested Textbooks

1. Joshi MS, Ransom ER, Nash DB, Ransom SB. The Healthcare Quality Book: Vision, Strategy, and Tools. 4th Edition. Health Administration Press; 2019.
2. Sollecito WA, Johnson JK, editors. McLaughlin and Kaluzny's Continuous Quality Improvement in Health Care. 6th Edition. Jones & Bartlett Learning; 2021.

Reference Books

1. National Accreditation Board for Hospitals & Healthcare Providers (NABH). Accreditation Standards for Hospitals. Latest Edition.
2. World Health Organization. Global Patient Safety Action Plan 2021-2030. WHO; 2021.
3. Joint Commission International. Joint Commission International Accreditation Standards for Hospitals. Latest Edition.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-8: Assuring Equitable Access to Quality Health Services; EPHF-9: Leadership, Governance, and Management; EPHF-10: Quality Assurance in Personal and Population-Based Health Services
ICAPHE Competency Framework	Healthcare Quality Management, Patient Safety, Accreditation, Clinical Governance, Healthcare Administration, and Quality Improvement
SDG Mapping	SDG 3: Good Health and Well-being; SDG 9: Industry, Innovation and Infrastructure; SDG 16: Peace, Justice and Strong Institutions

Delivery Mode: SWAYAM (ICMR) with Faculty Mentoring and Assessment**Course Description**

This elective course provides comprehensive knowledge of Health Technology Assessment (HTA) as a multidisciplinary approach for evaluating the clinical effectiveness, safety, cost-effectiveness, ethical, legal, organizational, and social implications of health technologies. Students develop competencies in evidence synthesis, economic evaluation, decision analysis, and policy translation to support evidence-informed healthcare decision-making and Universal Health Coverage (UHC).

Course Objectives

- **CO1:** Explain the principles, concepts, and applications of Health Technology Assessment in healthcare decision-making.
- **CO2:** Examine clinical effectiveness, safety evaluation, economic analysis, and evidence synthesis methods used in HTA.
- **CO3:** Apply HTA methodologies to assess pharmaceuticals, medical devices, diagnostics, digital health technologies, and public health interventions.
- **CO4:** Evaluate ethical, legal, organizational, and policy dimensions influencing health technology adoption.
- **CO5:** Develop evidence-informed HTA reports that support healthcare policy, reimbursement, and resource allocation decisions.

UNIT I: Foundations of Health Technology Assessment**(8 Hours)**

This unit introduces the concepts, evolution, principles, and scope of Health Technology Assessment. Students examine the HTA process, technology life cycle, evidence-based healthcare, priority setting, health system decision-making, Universal Health Coverage (UHC), strategic purchasing, and the role of HTA agencies at national and international levels, including HTAIn, WHO, NICE, and INAHTA.

UNIT II: Clinical Effectiveness, Safety and Evidence Synthesis**(10 Hours)**

This unit focuses on methods used to evaluate clinical effectiveness and safety. Topics include systematic reviews, meta-analysis, evidence grading (GRADE), comparative effectiveness research, randomized controlled trials, observational studies, diagnostic test evaluation, real-world evidence, pharmacovigilance, medical device surveillance, and critical appraisal of clinical evidence.

UNIT III: Economic Evaluation and Decision Modelling

(10 Hours)



This unit examines economic methods used in HTA. Students learn cost analysis, cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis, budget impact analysis, quality-adjusted life years (QALYs), disability-adjusted life years (DALYs), decision trees, Markov models, sensitivity analysis, modelling uncertainty, and value-based healthcare.

UNIT IV: Policy, Ethics and Organizational Assessment

(9 Hours)

This unit explores the broader dimensions of HTA. Topics include ethical analysis, equity considerations, legal and regulatory frameworks, organizational impact assessment, reimbursement policies, pricing strategies, stakeholder engagement, patient perspectives, implementation of HTA recommendations, national health programmes, and policy translation for evidence-informed decision-making.

UNIT V: Emerging Trends and Future Directions in HTA

(8 Hours)

This unit examines future developments including assessment of digital health technologies, artificial intelligence, precision medicine, genomic technologies, telemedicine, personalized healthcare, real-world data analytics, horizon scanning, adaptive HTA, environmental sustainability in healthcare technologies, and global innovations in health technology assessment.

Course Outcomes

Upon successful completion of the course, students will be able to:

- CO1: Explain the principles, methods, and applications of Health Technology Assessment.
- CO2: Evaluate clinical effectiveness, safety, and economic evidence for health technologies.
- CO3: Apply HTA methodologies to pharmaceuticals, diagnostics, medical devices, digital health technologies, and public health interventions.
- CO4: Assess ethical, legal, organizational, and policy implications of adopting health technologies.
- CO5: Develop evidence-informed HTA reports that support healthcare policy, reimbursement decisions, and efficient resource allocation.

Recommended Learning Resources

Suggested Textbooks

1. Drummond MF, Neumann PJ, Jonsson B, et al. Methods for the Economic Evaluation of Health Care Programmes. 5th Edition. Oxford University Press; 2024.
2. Goodman CS. HTA 101: Introduction to Health Technology Assessment. National Information Center on Health Services Research (NICHSR), U.S. National Library of Medicine. Updated online edition.

Reference Books

1. World Health Organization. Health Technology Assessment and Health Policy Decision-Making. WHO. Latest guidance.
2. Health Technology Assessment in India (HTAIn). HTAIn Methods Manual. Department of Health Research, Government of India. Latest Edition.
3. National Institute for Health and Care Excellence (NICE). Guide to the Methods of Technology Appraisal. Latest Edition.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-6: Public Health Research and Knowledge Generation; EPHF-8: Assuring Equitable Access to Essential Health Services; EPHF-10: Quality Assurance in Health Services; EPHF-11: Evidence-Informed Decision-Making and Innovation
ICAPHE Competency Framework	Health Technology Assessment, Health Economics, Economic Evaluation, Evidence Synthesis, Health Policy, and Healthcare Decision-Making
SDG Mapping	SDG 3: Good Health and Well-being; SDG 9: Industry, Innovation and Infrastructure; SDG 10: Reduced Inequalities; SDG 17: Partnerships for the Goals

26MPHT7614 GLOBAL HEALTH DIPLOMACY & GOVERNANCE



L-T-P-C: 2-1-0-3

Delivery Mode: SWAYAM with Faculty Mentoring and Assessment

Course Description

This elective course introduces the principles and practice of Global Health Diplomacy (GHD) and global health governance. Students develop competencies in international health negotiations, global health institutions, foreign policy, international law, multisectoral partnerships, and health security to address transnational public health challenges and strengthen global cooperation for health.

Course Objectives

- **CO1:** Explain the principles, concepts, and evolution of global health diplomacy and governance.
- **CO2:** Examine the roles of international organizations, treaties, and multilateral institutions in global health governance.
- **CO3:** Apply diplomatic negotiation, policy analysis, and stakeholder engagement strategies to address global health challenges.
- **CO4:** Evaluate international legal frameworks, health security mechanisms, and governance models influencing global public health.
- **CO5:** Develop evidence-informed diplomatic and policy strategies to strengthen international collaboration, health equity, and sustainable development.

UNIT I: Foundations of Global Health Diplomacy

(8 Hours)

This unit introduces the evolution, concepts, and scope of global health diplomacy. Students examine the relationship between health and foreign policy, diplomacy, globalization, international relations, sustainable development, health equity, soft power, global public goods, and the historical evolution of global health governance.

UNIT II: Global Health Governance and International Institutions

(10 Hours)

This unit focuses on the architecture of global health governance. Topics include the roles and mandates of the World Health Organization (WHO), United Nations agencies, World Bank, World Trade Organization (WTO), GAVI, the Global Fund, UNICEF, UNAIDS, regional organizations, public-private partnerships, international financing mechanisms, and multisectoral governance for health.

UNIT III: International Law, Health Security and Global Negotiations

(10 Hours)

This unit examines legal and diplomatic frameworks governing global health. Students learn about the International Health Regulations (IHR 2005), the WHO Pandemic Agreement, Framework Convention on Tobacco Control (FCTC), Trade-Related Aspects of Intellectual Property Rights (TRIPS), vaccine equity, antimicrobial resistance, pandemic preparedness, global health security, humanitarian diplomacy, and international negotiation strategies.

UNIT IV: Contemporary Challenges in Global Health Diplomacy

(9 Hours)

This unit explores emerging global health issues requiring diplomatic engagement. Topics include climate change and health, migration and refugee health, non-communicable diseases, digital health governance,

artificial intelligence, One Health, antimicrobial resistance, health misinformation, humanitarian crises, global supply chains, financing for health, and geopolitical determinants of health.

UNIT V: Future Directions in Global Health Leadership and Diplomacy (8 Hours)

This unit focuses on leadership and future competencies in global health diplomacy. Students examine strategic communication, policy advocacy, leadership for international organizations, negotiation simulations, South-South cooperation, global partnerships, implementation of the Sustainable Development Goals (SDGs), future governance reforms, and emerging opportunities for global public health professionals.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Explain the principles, institutions, and governance mechanisms of global health diplomacy.
- **CO2:** Analyze international treaties, governance structures, and diplomatic processes influencing global health.
- **CO3:** Apply negotiation, policy analysis, and stakeholder engagement strategies to global health challenges.
- **CO4:** Evaluate international responses to pandemics, climate change, health security, and global health equity.
- **CO5:** Develop evidence-informed diplomatic and governance strategies that strengthen international cooperation and public health outcomes.

Recommended Learning Resources

Suggested Textbooks

1. Kickbusch I, Nikogosian H, Kazatchkine M, et al. Global Health Diplomacy: Concepts, Issues, Actors, Instruments, Fora and Cases. Springer; 2021.
2. Lee K, Smith R. What is Global Health? 2nd Edition. Polity Press; 2024.

Reference Books

1. World Health Organization. World Health Report (Latest Edition).
2. Kickbusch I, Cassar Szabo MM. A New Governance Space for Health. Global Health Action. 2014.
3. Fidler DP. Negotiating Equitable Access to Vaccines, Medicines and Health Technologies: Lessons from COVID-19. Cambridge University Press; 2023.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHF)	EPHF-3: Health Protection and Governance; EPHF-4: Addressing Social Determinants of Health; EPHF-9: Leadership, Governance, and Management; EPHF-11: Evidence-Informed Policy and International Collaboration
ICAPHE Competency Framework	Global Health Governance, Health Diplomacy, International Health Policy, Leadership, Health Security, and Strategic Partnerships
SDG Mapping	SDG 3: Good Health and Well-being; SDG 10: Reduced Inequalities; SDG 13: Climate Action; SDG 16: Peace, Justice and Strong Institutions; SDG 17: Partnerships for the Goals

26MPHL7501: RESEARCH PROTOCOL DEVELOPMENT & ADVANCED ANALYTICS LAB



L-T-P-C: 0-0-2-2

Course Description

This laboratory course provides hands-on training in developing research protocols and applying advanced analytical techniques for public health research. Students gain practical experience in formulating research questions, preparing ethical research proposals, managing datasets, performing advanced statistical analyses using contemporary software, interpreting findings, and communicating scientific evidence.

Course Objectives

- **CO1:** Develop comprehensive research protocols aligned with scientific and ethical standards.
- **CO2:** Apply advanced statistical and epidemiological analytical techniques using statistical software.
- **CO3:** Perform data management, visualization, and interpretation for public health research.
- **CO4:** Prepare research documentation including ethics submissions, data analysis plans, and dissemination materials.
- **CO5:** Demonstrate competency in conducting reproducible and evidence-based public health research.

Exercise 1: Research Problem Identification and Protocol Development (5 Hours)

- Identifying research gaps through literature review
- Developing research objectives and hypotheses
- Conceptual and theoretical frameworks
- Preparing research protocol according to institutional and funding agency formats

Exercise 2: Ethics, Study Design and Data Management (5 Hours)

- Preparing Institutional Ethics Committee (IEC/IRB) submissions
- Sample size calculation
- Development of questionnaires and data collection tools
- Data coding, cleaning, validation, and quality assurance

Exercise 3: Advanced Statistical Analysis (8 Hours)

Hands-on analysis using **R, Jamovi, SPSS, or Stata:**

- Multiple linear and logistic regression
- Survival analysis
- Generalized Linear Models (GLM)
- Mixed-effects models
- Multivariable model building
- Model diagnostics
- Missing data analysis

Exercise 4: Advanced Epidemiological Analytics

(6 Hours)



- Propensity score analysis
- Survival curves
- ROC curve analysis
- Multilevel analysis
- Time-series analysis
- Basic spatial analysis
- Meta-analysis demonstrations
- Data visualization using dashboards and statistical graphics

Exercise 5: Scientific Reporting and Research Communication

(6 Hours)

- Preparing statistical analysis reports
- Interpretation of analytical outputs
- Preparation of publication-quality tables and figures
- Developing conference posters
- Scientific presentations
- Preparing manuscripts following reporting guidelines (STROBE, CONSORT, PRISMA, etc.)

Course Outcomes

Upon successful completion of the laboratory course, students will be able to:

- **CO1:** Develop scientifically sound and ethically compliant public health research protocols.
- **CO2:** Apply advanced statistical and epidemiological methods using statistical software.
- **CO3:** Analyze and interpret complex public health datasets accurately.
- **CO4:** Prepare research reports, manuscripts, and scientific presentations following international reporting standards.
- **CO5:** Demonstrate competency in conducting reproducible, ethical, and evidence-based public health research.

Software and Analytical Tools

Students will gain practical exposure to:

- R Statistical Software
- Jamovi
- IBM SPSS Statistics
- Stata
- Microsoft Excel (Advanced Analytics)
- OpenEpi
- RevMan (Introduction)
- QGIS (Basic Spatial Analysis)

Recommended Learning Resources

Suggested Textbooks

1. Creswell JW, Creswell JD. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 6th Edition. Sage Publications; 2023.
2. Pagano M, Gauvreau K. Principles of Biostatistics. 3rd Edition. CRC Press; 2022.

Reference Books

1. Kleinbaum DG, Klein M. Logistic Regression: A Self-Learning Text. 4th Edition. Springer; 2024.
2. Hosmer DW, Lemeshow S, Sturdivant RX. Applied Logistic Regression. 3rd Edition. Wiley.
3. Rothman KJ, Greenland S, Lash TL. Modern Epidemiology. 4th Edition. Wolters Kluwer; 2021.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-6: Public Health Research and Knowledge Generation; EPHF-11: Knowledge Management, Research, Innovation, and Evidence-Informed Decision-Making
ICAPHE Competency Framework	Research Methodology, Advanced Biostatistics, Data Analytics, Scientific Communication, and Evidence Generation
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 17: Partnerships for the Goals

Course Description

This capstone course enables students to independently conduct a public health research project from protocol implementation to dissertation submission and scientific publication. Under faculty supervision, students collect and analyze data, interpret findings, prepare a dissertation following institutional guidelines, develop a manuscript suitable for publication in a peer-reviewed journal, and defend their research through a comprehensive viva-voce examination.

Course Objectives

- **CO1:** Conduct an independent public health research study using appropriate scientific methods and ethical principles.
- **CO2:** Apply advanced analytical techniques to generate valid, reliable, and reproducible research findings.
- **CO3:** Prepare a high-quality dissertation and manuscript adhering to international scientific reporting standards.
- **CO4:** Communicate research findings effectively through scientific presentations, publications, and oral defense.
- **CO5:** Demonstrate professional competence, critical thinking, and ethical conduct in public health research.

COMPONENT I: Research Planning and Ethical Compliance**(30 Hours)**

Students finalize the approved research protocol, obtain Institutional Ethics Committee (IEC/IRB) approval where applicable, prepare operational plans, refine study instruments, organize logistics, and develop a detailed data management and analysis plan.

COMPONENT II: Data Collection and Quality Assurance**(60 Hours)**

Students undertake fieldwork or secondary data collection, implement quality assurance procedures, monitor data completeness and accuracy, maintain research documentation, ensure participant confidentiality, and manage research records according to institutional and ethical guidelines.

COMPONENT III: Data Management and Advanced Data Analysis**(50 Hours)**

Students perform data coding, cleaning, validation, statistical analysis, interpretation of results, preparation of analytical outputs, development of tables, figures, and graphical visualizations using appropriate statistical software.

COMPONENT IV: Dissertation Writing and Scientific Publication**(60 Hours)**

The evaluation of dissertation shall strictly focus on research originality, scientific rigor, methodology, ethical conduct, and submission of a manuscript formatted according to peer-reviewed journal standards. Publication acceptance shall NOT be a pre-condition for conferral of the Master of Public Health degree.

Students prepare a dissertation following university regulations, prepare publication-quality tables and figures, develop a manuscript suitable for submission to a peer-reviewed journal, incorporate supervisor feedback, and address reviewer comments where applicable.

COMPONENT V: Research Presentation and Viva-Voce

(40 Hours)

Students prepare oral presentations, defend their dissertation before an examination committee, demonstrate competence in research methodology and analytical interpretation, and respond to questions on the scientific, ethical, and practical implications of their research.

Course Outcomes

Upon successful completion of the course, students will be able to:

- **CO1:** Conduct an independent public health research study following scientific and ethical standards.
- **CO2:** Apply appropriate epidemiological, biostatistical, and analytical methods to address public health research questions.
- **CO3:** Prepare a dissertation and publication-ready manuscript that meet national and international academic standards.
- **CO4:** Critically interpret research findings and communicate evidence effectively to scientific and professional audiences.
- **CO5:** Demonstrate professional competency, ethical integrity, and independent research skills required for public health practice, doctoral studies, and research careers.

Research Requirements

Students shall:

- Complete an original public health research project under faculty supervision.
- Obtain Institutional Ethics Committee (IEC/IRB) approval wherever applicable.
- Submit a dissertation in accordance with The Apollo University guidelines.
- Prepare at least one manuscript in a format suitable for submission to a peer-reviewed indexed journal.
- Deliver a seminar presentation before dissertation submission.
- Successfully defend the dissertation through a comprehensive viva-voce examination.

Recommended Learning Resources

Suggested Textbooks

1. Creswell JW, Creswell JD. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 6th Edition. Sage Publications; 2023.
2. Greenhalgh T. How to Read a Paper: The Basics of Evidence-Based Medicine and Healthcare. 7th Edition. Wiley-Blackwell; 2024.

Reference Books

1. EQUATOR Network. Reporting Guidelines (STROBE, CONSORT, PRISMA, STARD, CARE, SRQR). Latest online resources.
2. International Committee of Medical Journal Editors (ICMJE). Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. Latest Edition.
3. Committee on Publication Ethics (COPE). Core Practices and Ethical Guidelines. Latest online resources.

Competency & Framework Alignment

Framework	Alignment
WHO Essential Public Health Functions (EPHFs)	EPHF-6: Public Health Research and Knowledge Generation; EPHF-11: Knowledge Management, Innovation, Research, and Evidence-Informed Decision-Making
ICAPHE Competency Framework	Independent Research, Scientific Writing, Advanced Data Analytics, Knowledge Translation, Evidence Synthesis, and Research Leadership
SDG Mapping	SDG 3: Good Health and Well-being; SDG 4: Quality Education; SDG 9: Industry, Innovation and Infrastructure; SDG 17: Partnerships for the Goals