



Module Guide

Global Public Health

Faculty European Campus Rottal-Inn

Examination regulations 01.10.2024

Date: Wed 21.10.2026 10:42



Study Plan

Global Public Health – Programme Structure

Semester 3	GPH-13 Master Thesis Research & Tutorial GPH- Scientific Writing Tutorial					
	30 ECTS					
Semester 2					Elective	Elective
	GPH-13 Research Methods and Writing skills	GPH-9 Universal Health Coverage	GPH-7 Global Public Health Law and Ethics	GPH- Project Management	Choose 2 Electives (not all available every semester): • GPH-18 Knowledge Based Systems • GPH- Entrepreneurship for Global Markets • GPH- Sustainable Energy Provision and Health • GPH-16 Intercultural Health Communication • GPH- 5 Outbreaks, Epidemics and Pandemics • GPH- Biostatistics	
	5 ECTS	5 ECTS	5 ECTS	5 ECTS	5 ECTS	5 ECTS
Semester 1					Elective	Elective
	GPH-1 Essentials of Global Public Health	GPH-2 Digital Health	GPH-3 Sustainable Health Economy	GPH-8 Epidemiology and Health Data Analysis	Choose 2 Electives (not all available every semester): • GPH-4 Gender Equality in Global Public Health • GPH- Collaborative Health Systems • GPH-6 Health Forecast – Future Causes of Death • GPH-14 Managed Care • GPH-15 Life Science for Public Health • GPH- Technology for Global Public Health • GPH- Global Mental Health	
	5 ECTS	5 ECTS	5 ECTS	5 ECTS	5 ECTS	5 ECTS

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GPH-01 ESSENTIALS OF GLOBAL PUBLIC HEALTH

Module code	GPH-01
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-01 Essentials of Global Public Health
Lecturers	Prof. Dr. Sabine Dittrich Dr. Petra Sevcikova
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

This module introduces students to the structures, actors, and health challenges that define global public health today. Students develop a broad understanding of how health priorities are shaped at local, national, and international levels and how diverse stakeholders collaborate to address current and future health challenges. It lays the conceptual foundation for the entire programme.

Learning Objectives

a) Professional competence

Students are able to:

- o Describe the structures of public health from local to international level and the mandates of key actors, including national health systems, NGOs, humanitarian organisations, and UN agencies
- o Explain the major communicable disease challenges (malaria, TB, HIV; neglected tropical diseases; AMR) and emerging priority areas (NCDs, climate change and health, surgical care, mental health)
- o Analyse the interconnected nature of health challenges and the social, economic, environmental, and commercial determinants of health



- o Critically discuss historical context, including the legacy of colonialism in global health and current efforts to decolonise global health practice

b) Methodological competence

Students are able to:

- o Review and synthesise data and literature on a specific health topic in a concise and structured manner
- o Analyse the roles and interactions of national and international actors within a defined health area
- o Apply global public health terminology correctly and critically assess proposed solutions to health challenges

c) Social and personal competence

Students are able to:

- o Engage in open and respectful group discussions drawing on diverse lived and learned experiences across the cohort
- o Collaborate effectively across cultural and disciplinary backgrounds, reflecting real-world dynamics in international health organisations

Applicability in this and other Programs

This module is relevant to all health-related programmes and to students seeking to situate their specialist area within the global public health context. It is a prerequisite in spirit for all subsequent programme modules.

Entrance Requirements

None.

Learning Content

1. Overview of key global health topics past, present, and future: the 'big three' (malaria, TB, HIV); neglected tropical diseases; antimicrobial resistance; NCDs; climate change and health; emerging areas (mental health, surgical care)
2. Dual lens of individual and population health: how individual health decisions connect to public health priorities
3. Historical context: the influence of colonial history on current global health structures and the debate around decolonising global health
4. Actors and their mandates: local health providers, national and international NGOs, humanitarian organisations, UN agencies, academic institutions, and donors
5. Case study: exploring a specific health challenge through small-group collaboration

Teaching Methods

Lectures, structured learning tasks, web-based discussions and student presentations, independent study, seminars, and group case study work. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Rosling, H., Rönnlund, A.R. & Rosling, O. (2018). Factfulness. Flatiron Books.
- o Skolnik, R. (2019). Global Health 101 (4th ed.). Jones & Bartlett Learning.
- o Riegelman, R.K. (2019). Public Health 101: Improving Community Health. Jones & Bartlett Learning.
- o Gilmore, A.B. et al. (2023) Defining and conceptualising the commercial determinants of health. *Lancet*. 2023 Apr 8;401(10383):1194-1213.
- o The *Lancet* Series on racism, xenophobia, discrimination, and health (2022). <https://www.thelancet.com/series-do/lancet-series-racism-xenophobia-discrimination-and-health-2022>
- o WHO Global Health Observatory. <https://www.who.int/data/gho>
- o WHO newsletters and global health updates. <https://www.who.int/news>

GPH-02 DIGITAL HEALTH

Module code	GPH-02
Module coordination	Prof. Dr. Dominik Böhler
Course number and name	GPH-02 Digital Health
Lecturer	Prof. Dr. Dominik Böhler
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Students are equipped with hands-on knowledge about communicating and in socio-technical systems in global public health. The necessary basics for data-driven communication and implementation of digital systems will be created via interactive sessions and a real-world data visualization project:

Professional competence

Students

- o understand the concept of qualified digital health as well as IT-Awareness: data security, privacy and safety methods to ensure the appropriate handling with sensitive data.
- o know principles of software engineering foundations related to digital health
- o are able to utilise the digital tools and have skills required to use of IoT in global public health (data gathering, analysis, anticipation, reaction)
- o understand the role and increasing importance of digital public health globally and are able to identify advances that healthcare depends increasingly on intensive interventions, technological developments and expensive pharmaceuticals.

- o are able to identify the digital health technologies liaison of Sustainable Development Goals (SDGs) (e.g. access to health service infrastructures, technology acceptance, ownership, and a culture of data use for decision-making)
- o Can link the different digital infrastructures and solutions with their impact on climate change
- o realise an (illustrative or practice) development project
- o understand Digital Health IoT ecosystems and IoT data transfer from sensors to the cloud and related data-analysis.

Methodological competence

Students

- o produce user-centered digital solution prototype in the health sector and carry out a project work in small groups (incl. short presentations on the as-is analysis and project report)

Social and Personal competence

Students

- o are able to view their own communication situations from the meta-level and use these skills in individual and group discussions as appropriate to the situation

Applicability in this and other Programs

The module can be used in other study programs related to healthcare.

Entrance Requirements

None.

Learning Content

Digital health in theory and practice: concepts, definitions, and the global landscape

Computer networking foundations and markup languages relevant to health applications

IT-awareness: data security, privacy, and safety in digital health systems

Analytics and data visualisation: tools, methods, and applications in public health

Cloud infrastructure and social and healthcare IT systems

IoT in global public health: data gathering, analysis, and response

Prototyping an IT project: from user needs to working prototype and report

Teaching Methods

Lectures, learning tasks, web-discussions/presentations, Independent studies, seminars, workshops on methodology, Moodle learning environment contains materials

Recommended Literature

Hoyt R.E., Hersh W.R. (2018): Health Informatics: Practical Guide for Healthcare and Information Technology Professionals. 7th Edition. Lulu.

- o Nelson R., Staggers N. (2018): Health Informatics: An Inter-professional Approach. Elsevier, St. Louis, USA.
- o Braunstein Mark L. (2015): Practitioner's Guide to Health Informatics. Springer, Switzerland.
- o Venot A., Burgun A., Quantin C. (2014): Medical Informatics, e-Health. Springer, Paris/Heidelberg
- o Fenton S.H., Biedermann S. (2014): Introduction to Healthcare Informatics. AHIMA Press, Chicago.
- o Braunstein Mark L. (2014): Contemporary Health Informatics. AHIMA Press, Chicago.
- o Gupta R.P. (2021): Digital Health ? Truly Transformational. Wolters Kluwer.
- o Gogia S (2020): Fundamentals of Telemedicine and Telehealth. Elsevier.
<https://doi.org/10.1016/B978-0-12-814309-4.00004-5>
- o Jude H.D., Balas V.E. (2019): Telemedicine Technologies: Big Data, Deep Learning, Robotics, Mobile and Remote Applications for Global Healthcare. Elsevier.
- o Topol E. (2019): Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. 1st Edition. Basic Books, NY (US).
- o Hoyt R.E., Hersh W.R. (2018): Health Informatics: Practical Guide. 7th edition. Endorsed by AMIA.
- o Istepanian R.S.H., Woodward B. (2017): m-Health: Fundamentals and Applications. Wiley, New Jersey
- o Venot A., Burgun A., Quantin C. (2014): Medical Informatics, e-Health. Springer, Paris/Heidelberg.
- o Fong B., Fong A.C.M., Li C.K. (2011): Telemedicine Technologies: Information Technologies in Medicine and Telehealth. Wiley, Chichester (UK).
- o Wootton R., Patil N.G., Scott R.E., Ho K. (2009): Telehealth in the Developing World. Royal Society of Medicine Press, London/Glasgow.

- o Grasczew G. and Rakowsky S. (2011): Telemedicine Techniques and Applications. InTech.
- o Kumar A. (2019): Basic Concepts of Information Security: A handbook. LAP LAMBERT Academic Publishing.

GPH-03 SUSTAINABLE HEALTH ECONOMY

Module code	GPH-03
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-03 Sustainable Health Economy
Lecturers	Prof. Dr. Sabine Dittrich Dr. Petra Sevcikova
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Health systems do not operate in isolation from economic forces. This module develops students' understanding of health economics and its relevance to public health policy and system design, using the WHO health system framework. Students learn to apply economic analysis to healthcare challenges, examine how institutional and market forces shape health outcomes, and critically evaluate policy solutions in both high-income and low- and middle-income settings.

Learning Objectives

a) Professional competence

Students are able to:

- o Explain fundamental economic concepts as applied to healthcare: supply and demand, market failure, externalities, and the role of health insurance
- o Analyse the relationship between economic growth, inequality, and population health outcomes
- o Assess the impact of institutions, financing mechanisms, and incentive structures on healthcare providers and consumers

- o Examine trade-offs of health policies considering access, costs, quality, efficiency, and sustainability

b) Methodological competence

Students are able to:

- o Apply economic reasoning to health policy questions and critique current health system structures
- o Identify and propose solutions to economic challenges in healthcare, accounting for imperfect information and uncertainty
- o Use economic frameworks to compare health system performance across different country contexts

c) Social and personal competence

Students are able to:

- o Critically examine their own and peers' assumptions about healthcare trade-offs in constructive group discussions
- o Engage with contested health economic questions in a structured and evidence-informed way

Applicability in this and other Programs

This module is relevant to health-related programmes and to students interested in health policy, health system management, or global development.

Entrance Requirements

None.

Learning Content

1. Health economy and healthcare reform
2. The economic perspective: perfect markets and market failure in healthcare
3. Supply and demand in healthcare markets and public-private roles
4. Healthcare financing and the role of insurance and risk pooling
5. Healthcare and uneconomic growth: from overconsumption to sufficiency
6. Medicine prioritisation and pharmaceutical supply chains
7. Health workforce and incentive structures in healthcare delivery
8. Data and health information systems for informed health policy-making

Teaching Methods

- o Lectures, slides combining static and interactive content, quizz, guided readings and group discussions, external video resources. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Olsen, J.A. (2017). Principles in Health Economics and Policy. Second Edition. Oxford, New York: Oxford University Press.
- o Rice, T.H. & Unruh, L. (2016). The Economics of Health Reconsidered (4th ed.). Health Administration Press.
- o Niu, X.T., Yang, Y.C. & Wang, Y.C. (2021). Does economic growth improve public health? A cross-regional heterogeneous study in China. Frontiers in Public Health, 9.
- o OECD (2015). Promoting Health, Preventing Disease: The Economic Case. OECD Publishing.
- o Gruber, J. MIT lecture series on health economics.
<https://www.youtube.com/watch?v=jsiCft5v2dk>

GPH-07 GLOBAL PUBLIC HEALTH LAW AND ETHICS

Module code	GPH-07
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-2101 Global Public Health Law and Ethics
Lecturer	XXX
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 90 hours self-study: 60 hours Total: 150 hours
Type of Examination	Portfolio
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Law and ethics provide the normative framework within which global public health action takes place. This module equips students with the conceptual and practical tools to navigate legal and ethical questions in health: from international health law and human rights frameworks to ethical decision-making in research, resource allocation, and crisis response. Students learn to apply legal and ethical reasoning to real-world dilemmas in global public health.

Learning Objectives

a) Professional competence

Students are able to:

- o Explain the foundations of law relevant to public health, including national, regional, and international legal frameworks
- o Describe the role of WHO and other international bodies in establishing health law and governance norms
- o Apply concepts of legal epidemiology and legal mapping to public health questions across diverse cultural settings
- o Distinguish between medical ethics, global public health ethics, and bioethics, and understand their respective domains

- o Analyse ethical challenges arising from conflicts between individual rights and public health interests

b) Methodological competence

Students are able to:

- o Apply ethical reasoning frameworks to health care dilemmas and justify decisions in a structured way
- o Critically assess legal and regulatory frameworks for their public health implications
- o Use legal mapping tools to evaluate legal infrastructure in a specific health context

c) Social and personal competence

Students are able to:

- o Synthesise and present arguments on contested legal and ethical issues through debate and structured presentations
- o Develop perspective-taking skills and empathy when engaging with ethically complex health scenarios

Applicability in this and other Programs

This module is relevant to health-related programmes and to students interested in health governance, international law, health policy, and bioethics.

Entrance Requirements

None.

Learning Content

- o Foundations of public health law: national, regional, and international frameworks
- o The role of WHO and international legal instruments in global health governance
- o Legal epidemiology: using law as a public health intervention; legal mapping tools
- o Human rights and health: core instruments and their application
- o Ethics in global public health: foundational theories, key principles, and application
- o Medical ethics, global public health ethics, and bioethics: scope and distinctions
- o Case studies: ethical and legal dilemmas in public health practice (resource allocation, vaccination, pandemic response, research ethics)

Teaching Methods

Independent study, lectures, seminars, workshops, debate sessions, learning tasks, and web-based discussions. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Coleman, C.H., Bouësseau, M.C. & Reis, A. (2008). The contribution of ethics to public health. *Bulletin of the World Health Organization*, 86, 578A.
- o Lee, L.M. (2017). A bridge back to the future: public health ethics, bioethics, and environmental ethics. *American Journal of Bioethics*, 17(9), 512.
- o Barnett, D.J. et al. (2009). Resource allocation on the frontlines of public health preparedness and response. *Public Health Reports*, 124(2), 295303.
- o Gostin, L.O. & Wiley, L.F. (2016). *Public Health Law: Power, Duty, Restraint* (3rd ed.). University of California Press.

GPH-08 EPIDEMIOLOGY AND HEALTH DATA ANALYTICS

Module code	GPH-08
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	Epidemiology and Health Data Analytics
Lecturers	Prof. Dr. Sabine Dittrich Prof. Dr. Andreas Widenhorn
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Written examination 90min.
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Evidence-based public health depends on the ability to collect, analyse, and interpret health data rigorously. This module introduces the core concepts and methods of epidemiology, biostatistics, and health data analytics, and develops students' capacity to critically evaluate research literature and apply these methods in practice. Students work with real health data, interpret statistical outputs, and draw valid conclusions to inform public health decisions.

Learning Objectives

a) Professional competence

Students are able to:

- o Explain and apply key epidemiological measures of frequency and association: incidence, prevalence, relative risk, odds ratios, and attributable risk
- o Describe and evaluate epidemiological study designs: cross-sectional, cohort, case-control, RCTs, and systematic reviews
- o Identify and control for confounding, bias, and effect modification in epidemiological research

- o Interpret and critically appraise the statistical analysis presented in published epidemiological studies

b) Methodological competence

Students are able to:

- o Apply common data analysis workflows: data cleaning, descriptive statistics, and inferential analysis
- o Visualise health data effectively and interpret results in a public health context
- o Critically evaluate the quality of statistical processing in epidemiological literature

c) Social and personal competence

Students are able to:

- o Collaborate in a team to analyse a complex epidemiological question, communicating findings precisely
- o Present epidemiological findings clearly and accessibly to a mixed audience

Applicability in this and other Programs

This module is relevant to health-related programmes and provides essential methodological foundations for GPH-13A Research Methods and the Master's thesis.

Entrance Requirements

None.

Learning Content

- o Introduction to epidemiology: key concepts, measures, and historical context
- o Epidemiological study designs: descriptive and analytical studies; strengths and limitations
- o Confounding, bias, and effect modification: identification and control strategies
- o Statistical analysis in health research: descriptive statistics, hypothesis testing, confidence intervals
- o Data visualisation: methods, tools, and communication of health findings
- o Critical appraisal of epidemiological literature: evaluating study quality and statistical reporting
- o Introduction to health data analytics: common data workflows and software environments

Teaching Methods

Lectures, seminars, workshops, independent study, applied data exercises, and discussions with a final journal club to apply learned concepts. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Webb, P. & Bain, C. (2011). Essential Epidemiology: An Introduction for Students and Health Professionals (2nd ed.). Cambridge University Press.
- o Gordis, L. (2014). Epidemiology (5th ed.). Elsevier Saunders.
- o Greenhalgh, T. (2019). How to Read a Paper (6th ed.). Wiley-Blackwell / BMJ Books.
- o Batra, N. et al. (2021). The Epidemiologist R Handbook.
<https://epirhandbook.com/en/>

GPH-09 UNIVERSAL HEALTH COVERAGE

Module code	GPH-09
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	Universal Health Coverage
Lecturer	Prof. Dr. Sabine Dittrich
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Written examination 90min.
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Universal Health Coverage (UHC) is a cornerstone of the SDG agenda and one of the central challenges for health systems worldwide. This module develops a deep understanding of UHC's dimensions financial risk protection, access to essential services, and access to safe and effective medicines and vaccines and equips students to analyse, evaluate, and propose improvements to UHC performance across diverse country contexts.

Learning Objectives

a) Professional competence

Students are able to:

- o Explain the core components of UHC and how they are operationalised in different health system contexts
- o Connect health system considerations with health outcomes
- o Describe and compare health financing mechanisms and their implications for equity and access
- o Analyse UHC progress and challenges in both high-income and low- and middle-income countries using standardised measurement frameworks
- o Evaluate the regulatory mechanisms and policy levers used to advance UHC

b) Methodological competence

Students are able to:

- o Apply UHC measurement tools and indices to assess health system performance across countries
- o Critically analyse UHC financing concepts, including social health insurance, co-payments, and tax-based financing
- o Develop evidence-based proposals for improving UHC in a defined setting

c) Social and personal competence

Students are able to:

- o Apply logical reasoning and critical thinking to connect evidence to policy recommendations
- o Engage in structured debate on contested trade-offs in UHC design, including efficiency versus equity

Applicability in this and other Programs

This module is relevant to health-related programs and to students interested in health policy, health system strengthening, global health governance, and international development.

Entrance Requirements

None.

Learning Content

- o The UHC concept: definition, dimensions, and the UHC cube framework
- o Health financing for UHC: tax-based, social insurance, community-based, and out-of-pocket models
- o Measuring and monitoring UHC: WHO/World Bank frameworks and the UHC Service Coverage Index
- o Regulatory mechanisms for UHC: essential health packages, medicines access, and provider payment systems
- o UHC in high-income countries: challenges, reforms, and lessons
- o UHC in low- and middle-income countries: financing gaps, NCDI burden, and fragmented systems
- o Policy implications and country case studies

Teaching Methods

Independent study, lectures, seminars, workshops, learning tasks, and discussions and student presentations case studies. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Bukhman, G. et al. (2020). The Lancet NCDI Poverty Commission: bridging a gap in UHC for the poorest billion. The Lancet, 396(10256), 9911044.
- o Lal, A. et al. (2021). Fragmented health systems in COVID-19: rectifying the misalignment between global health security and UHC. The Lancet, 397(10268), 6167.
- o WHO (2010). Health Financing Challenges and Institutional Options to Move Towards Universal Coverage in Nicaragua. WHO Discussion Paper No. 2-2010.
- o Wagstaff, A. et al. (2018). Progress on catastrophic health spending in 133 countries. The Lancet Global Health, 6(2), e169e179.

GPH- PROJECT MANAGEMENT

Module code	GPH-
Module coordination	Prof. Dr. Michelle Cummings-Koether
Course number and name	GPH-1 Project Management
Lecturers	Prof. Dr. Michelle Cummings-Koether Andreas Unterreitmeier
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Weighting of the grade	
Language of Instruction	English

Module Objective

Project management is a core competency for global public health professionals, whether managing a local protocol implementation, a multi-country research study, or a donor-funded programme. This module introduces students to the principles and tools of project management and connects them directly to the realities of international public health work: multi-stakeholder accountability, donor reporting, and the management of risk, timelines, and governance across complex settings.

Learning Objectives

a) Professional competence

Students are able to:

- o Describe the phases of a project lifecycle and the key tools used for planning, implementation, monitoring, and close-out
- o Explain the different roles in project management and the governance structures
- o Apply basic project management skills to a defined global public health project scenario
- o Understand how project management connects to monitoring and evaluation (M&E) and donor reporting requirements

b) Methodological competence

Students are able to:

- o Plan and structure project work, schedule activities, and evaluate work in progress against milestones
- o Employ tools to monitor project progress and document roles and responsibilities clearly
- o Assess project risks using risk/impact matrices and develop mitigation strategies
- o Write a structured technical project report and present project results orally

c) Social and personal competence

Students are able to:

- o Collaborate effectively in a multidisciplinary team across cultural and technical boundaries

Reflect on the interdependence of roles and stakeholders in achieving project success

Applicability in this and other Programs

This module is relevant to all students planning to work in international health, development, or any sector requiring multi-stakeholder project implementation and donor accountability.

Entrance Requirements

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Learning Content

1. Introduction to project management: phases, methods, and terminology
2. Working in multicultural international teams: roles, communication, and collaboration
3. Planning and scheduling: tools for efficient project design and timeline management
4. Risk analysis and management: risk/impact matrices and mitigation strategies
5. Monitoring and evaluation: connecting PM to M&E frameworks and log frames
6. Donor reporting and accountability: technical reports, governance, and stakeholder communication
7. Case study: applying PM tools to a public health project scenario

8. Technical project report writing and oral presentation of results

Teaching Methods

Seminar-style teaching, team work, and self-directed learning. Students collaborate closely to carry out a small project, training competencies acquired during the programme in a self-guided manner. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Kerzner, H. (2013). Project Management: A Systems Approach to Planning, Scheduling and Controlling (11th ed.). Wiley.
- o Project Management Institute (2021). A Guide to the Project Management Body of Knowledge (PMBOK Guide, 7th ed.). PMI.
- o Kusek, J.Z. & Rist, R.C. (2004). Ten Steps to a Results-Based Monitoring and Evaluation System. World Bank.
- o Robertson T, Sawadogo-Lewis T. Building coherent monitoring and evaluation plans with the Evaluation Planning Tool for global health. Glob Health Action. 2022

GPH-4 GENDER EQUALITY IN GLOBAL PUBLIC HEALTH

Module code	GPH-4
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-04 Gender Equality in Global Public Health
Lecturers	Prof. Dr. Sabine Dittrich Matilda Subek Simon
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Objectives

This module critically examines how gender operates as a social determinant of health across diverse populations and contexts. Drawing on medical and public health research, students explore how gender interacts with structural factors including race, class, and geography to produce differential health risks and outcomes. Intersectional frameworks are used to interpret epidemiological patterns such as disparities in maternal mortality, injury rates, and access to care, while identifying evidence gaps and methodological limitations in current global health data. Grounded in the SDG agenda (SDGs 3, 4, and 5), students connect normative global frameworks to empirical public health evidence, developing the analytical tools to assess how institutional biases, historical legacies, and social determinants shape medical knowledge and care practices.

Learning Objectives

a) Professional competence

Students are able to:

- o Analyse how gender influences patterns in health risks, outcomes, and healthcare access using population-level data and public health research

- o Evaluate how intersectional factors including race, socioeconomic status, and geography interact with gender to shape epidemiological patterns and clinical disparities
- o Critically assess gaps in medical research and surveillance systems, including the underrepresentation or misrepresentation of specific gendered populations
- o Interpret health disparities within broader economic, political, and historical frameworks, with attention to the long-term impacts of colonialism, labour systems, and policy
- o Explain the key provisions and monitoring frameworks of SDG 3, SDG 4, and SDG 5 and connect them to empirical health outcomes data

b) Methodological competence

Students are able to:

- o Apply intersectional and theoretical frameworks as interpretive tools for understanding disparities in areas such as reproductive health, injury prevalence, mental health, and access to gender-affirming care
- o Use data interpretation exercises and evidence mapping to assess how social determinants and institutional biases shape medical knowledge
- o Critically assess global datasets, surveillance systems, and published research for gendered evidence gaps and methodological limitations
- o Conduct a structured literature review on a gender and health topic and produce an independent research paper

c) Social and personal competence

Students are able to:

- o Reflect critically on their own positionality, assumptions, and cultural background with respect to gender, health, and power
- o Develop joint research goals and collaborative outputs as part of a team, drawing respectfully on diverse lived experiences within the cohort

Applicability in this and other Programs

This module is relevant to programmes focused on global health, sustainability, gender studies, international development, and health policy. Skills in intersectional analysis and evidence critique are transferable across all public health domains.

Entrance Requirements



None.

Learning Content

9. Gender as a social determinant of health: concepts, frameworks, and population-level evidence
10. Intersectionality in public health: how race, class, geography, and gender interact to produce health disparities
11. SDG 3, 4, and 5: goals, indicators, monitoring frameworks, and connections to health equity
12. Epidemiological patterns through a gender lens: maternal mortality, injury rates, mental health, NCDs – interpreting data and identifying gaps
13. Evidence gaps and methodological limitations: underrepresentation and misrepresentation in health research and surveillance
14. Historical and political determinants of gender and health: colonialism, labour systems, and the long arc of policy
15. Reproductive health, gender-affirming care, and access: evidence, disparities, and rights-based frameworks
16. Case studies and data interpretation exercises: evidence mapping and applied intersectional analysis
17. Research paper: independent critical analysis of a current issue at the intersection of gender and global public health

Teaching Methods

Lectures, case study analysis, structured data interpretation exercises, evidence mapping activities, web-based discussions, student presentations, independent study, and guided research paper development. Materials are provided via the Moodle learning environment.

Recommended Literature

Kumar, S. (2016). From MDGs to SDGs: addressing unfinished agenda. National Health Systems Resource Centre, India.

UNDP (2020). Gender Inequality and the COVID-19 Crisis: A Human Development Perspective.

Lozano, R. et al. (2018). Measuring progress from 1990–2017 and projecting attainment to 2030 of health-related SDGs for 195 countries. The Lancet, 392(10159), 2091–2138.



PAHO Gender Equality Policy. <https://www.paho.org>

European Parliament (2020). The Policy on Gender Equality in Germany. European Parliamentary Research Service.

GPH-5 HEALTH FORECAST – FUTURE CAUSES OF DEATH

Module code	GPH-5
Module coordination	Prof. Dr. Georgi Chaltikyan
Course number and name	GPH-5 Health Forecast – Future Causes of Death
Lecturers	Prof. Dr. Georgi Chaltikyan Fara Fernandes
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Written assignment (PStA)
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objectives

The burden of disease is not static: the conditions that dominate global mortality today differ fundamentally from those a century ago, and the landscape of health challenges will continue to shift. This module introduces students to the dynamic global burden of disease, equipping them to understand current patterns, forecast emerging threats, and critically evaluate the social, economic, and environmental forces that will shape the health challenges of coming decades.

Learning Objectives

a) Professional competence

Students are able to:

- o Explain the demographic and epidemiological transitions and their consequences for health systems across income levels
- o Apply core concepts of burden of disease measurement: DALYs, HALE, and the Global Burden of Disease (GBD) study

- o Describe the determinants, trends, and projected trajectories of communicable diseases, NCDs, injuries, environmental threats, and nutritional conditions
- o Evaluate digital health tools and approaches relevant to forecasting and addressing future disease burden

b) Methodological competence

Students are able to:

- o Analyse and compare disease burden data across regions and income levels using GBD and WHO data sources
- o Apply forecasting concepts to anticipate future health system needs in a defined country or region
- o Present a country- or region-specific future health challenge in a comprehensive, evidence-informed written assignment

c) Social and personal competence

Students are able to:

- o Work in small groups to research and present health forecasting challenges from diverse global contexts
- o Communicate complex, data-driven health projections clearly and confidently to a mixed audience

Applicability in this and other Programs

This module is relevant to health-related programs and to students interested in health policy, global health strategy, and health systems planning.

Entrance Requirements

None.

Learning Content

1. Health determinants, measurements, and trends: demographic and epidemiological transitions; DALYs, HALE, GBD; leading causes of death by income group
2. Future of health, education, poverty, and the economy: links between health, productivity, equity, and development
3. Future of communicable diseases: current burden, emerging and re-emerging infections, lessons from COVID-19, future pandemic risks

4. Future of non-communicable diseases: global burden, risk factors, cost-effective interventions, and future projections
5. Future of injuries and environmental health: burden, prevention, and future challenges
6. Future of nutrition and global health: undernutrition, obesity, and nutritional transitions
7. Future of women's health and child and adolescent health: specific burden, determinants, and interventions
8. Digital Health for burden of disease forecasting: tools, data platforms, and emerging applications

Teaching Methods

Lectures, seminars, case studies, class discussions, group work, student presentations, and applied data exercises using GBD Compare and WHO Global Health Observatory. Guest lecture by an external expert where available. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Skolnik, R. (2026). *Global Health 101* (5th ed.). Jones & Bartlett Learning.
- o Jacobsen, K.H. (2022). *Introduction to Global Health* (4th ed.). Jones & Bartlett Learning.
- o Riegelman, R.K. and Kirkwood, B (2023). *Public Health 101: Improving Community Health (4th ed.)*, Jones & Bartlett Learning.
- o **GBD 2021 Diseases and Injuries Collaborators (2024).** *Global burden of 371 diseases and injuries in 204 countries and territories and 811 subnational locations, 1990-2021: a systematic analysis for the Global Burden of Disease Study 2021. The Lancet.* 403(10440):2133-2161.
- o IHME (2026). GBD Compare. <https://vizhub.healthdata.org/gbd-compare/>
- o WHO Global Health Observatory. <https://www.who.int/data/gho>

GPH-14 MANAGED CARE

Module code	GPH-14
Module coordination	Dr. Roland Wiest
Course number and name	GPH-14 Managed Care
Lecturers	Dr. Roland Wiest
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Written examination (schrP, 90 min.)
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Managed care represents a set of health economic management strategies designed to improve cost-effectiveness and quality while managing interface challenges in complex health systems. Originally developed in the United States, managed care instruments have been adapted across diverse health systems. This module introduces students to the conceptual foundations and practical instruments of managed care, with particular attention to the German context, and develops the skills to analyse, evaluate, and advise on managed care solutions.

Learning Objectives

a) Professional competence

Students are able to:

- o Explain the historical development and core conceptual framework of managed care
- o Describe the range of managed care instruments: integrated care, structural contracts, selective contracting, disease management programmes, doctors' networks, and ambulatory health care centres

- o Analyse assessment and classification systems used to evaluate managed care arrangements
- o Evaluate the legal framework conditions for new forms of care in the German and international context

b) Methodological competence

Students are able to:

- o Apply economic analysis to managed care instruments, including sample calculations and cost-effectiveness assessments
- o Evaluate managed care instruments and identify their applicability in a given health system context

c) Social and personal competence

Students are able to:

- o Compare the legal, economic, and ethical implications of managed care and discuss their application critically in group settings
- o Develop and present solutions to managed care challenges through collaborative group work

Applicability in this and other Programs

This module is relevant to health-related programmes and to students interested in health system management, health economics, or the German health care system.

Entrance Requirements

none

Learning Content

1. Historical development of managed care and its international adaptation
2. Core managed care instruments: selective contracting, gatekeeping, and utilisation review
3. Disease management programmes, case management, and integrated care models
4. Remuneration systems and incentive design in managed care
5. Quality management frameworks in managed care

6. HMOs and organisational models across different country contexts
7. Legal framework conditions for new forms of care in Germany
8. Assessment methods and applied case study analysis

Teaching Methods

Lectures, seminars, case studies, class discussions, group exercises, and student presentations. Materials are provided via the Moodle learning environment.

Recommended Literature

- Glied, S. (2000). Managed care. In Culyer, A.J. & Newhouse, J.P. (Eds.), Handbook of Health Economics (Vol. 1, pp. 707–753). Elsevier.
- Abadia, C.E. & Oviedo, D.G. (2009). Bureaucratic itineraries in Colombia: a tool to assess managed-care health care systems. *Social Science & Medicine*, 68(6), 1153–1160.
- Hillblom, D. et al. (2014). The impact of IT on managed care pharmacy: today and tomorrow. *Journal of Managed Care Pharmacy*, 20(11), 1073–1079.
- Amelung, V.E. (2012). *Managed Care: Neue Wege im Gesundheitsmanagement* (5th ed.). Springer Gabler

GPH-15 TECHNOLOGY AND INNOVATIONS FOR PUBLIC HEALTH

Module code	GPH-15
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-16 Technology and Innovations for Public Health
Lecturers	Prof. Dr. Sabine Dittrich
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Oral examination
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Innovations vaccines, diagnostics, drugs, medical devices, digital tools have transformed the practice of medicine and public health. Yet the road from concept to patient is long, expensive, and governed by rigorous evidence and regulatory requirements. This module introduces students to the product development and study pipeline needed to move health technology innovations from concept to deployment, with a focus on clinical evidence generation, regulatory frameworks, and the challenges of access and implementation in global settings.

Learning Objectives

a) Professional competence

Students are able to:

Describe the phases of health technology product development from concept through clinical evidence generation to regulatory approval and access

Explain the principles of Good Clinical Practice (GCP) and Good Laboratory Practice (GLP) and their role in ensuring patient safety and data integrity

Identify different types of regulatory bodies and approval pathways relevant to global public health contexts

Critically assess the market access, deployment, and implementation challenges facing approved health innovations

b) Methodological competence

Students are able to:

- Describe the phases of health technology product development from concept through clinical evidence generation to regulatory approval and access
- Explain the principles of Good Clinical Practice (GCP) and Good Laboratory Practice (GLP) and their role in ensuring patient safety and data integrity
- Identify different types of regulatory bodies and approval pathways relevant to global public health contexts
- Critically assess the market access, deployment, and implementation challenges facing approved health innovations

c) Social and personal competence

Students are able to:

Collaborate in a small group to develop and present a basic study protocol for a health technology innovation

Engage respectfully across different cultural and technical backgrounds in discussions about technology translation challenges

Applicability in this and other Programs

This module is relevant to global public health, engineering, and life science programmes where the translation of health technologies into practice is a core concern.

Entrance Requirements

none

Learning Content

1. Overview of product development pipelines: drugs, diagnostics, vaccines, and digital health innovations

2. Use cases and Target Product Profiles (TPPs): defining needs and specifications before development begins
3. Clinical evidence generation: study design, GCP/GLP, and the path to regulatory submission
4. Regulatory approval frameworks: national and international bodies; the global public health context
5. Access and deployment challenges: market access, health technology assessment, and implementation ecosystems
6. Group project: developing and presenting a basic study protocol for a defined health technology innovation

Teaching Methods

Lectures, learning tasks, web-based discussions, independent study, seminars, and a group project in which students develop and present a study protocol. Materials are provided via the Moodle learning environment.

Recommended Literature

- Policy Cures Research. G-FINDER and R&D landscape reports. <https://www.policycuresresearch.org/>
- WHO R&D Observatory. <https://www.who.int/observatories/global-observatory-on-health-research-and-development>
- Treweek, S. & Zwarenstein, M. (2009). Making trials matter: pragmatic and explanatory trials and the problem of applicability. *Trials*, 10, 37.
- ICH E6 (R2) Guideline for Good Clinical Practice. <https://www.ich.org>

GPH-16 INTERCULTURAL HEALTH COMMUNICATION

Module code	GPH-16
Module coordination	Prof. Dr. Michelle Cummings-Koether
Course number and name	GPH-16 Intercultural Health Communications
Lecturers	Prof. Dr. Michelle Cummings-Koether
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Cultural differences shape how health information is communicated, received, and acted upon – within teams, with patients, and across institutions. This module develops students' intercultural competence for professional health communication, equipping them to recognise, navigate, and reduce cultural misunderstandings in international health environments. Through case studies, self-reflection, and applied exercises, students build the skills to communicate more effectively across cultural contexts.

Learning Objectives

a) Professional competence

Students are able to:

Explain key theories, concepts, and models in intercultural health communication, including established cultural standardisation frameworks

Analyse how communication styles, cultural standards, and emotional intelligence affect health communication in international settings

Apply strategies to reduce misunderstandings and conflict in cross-cultural health interactions

Evaluate the interplay of cultural awareness, medical urgency, and communication skills in designing effective health communication

b) Methodological competence

Students are able to:

- Differentiate between cultural types and communication patterns and adapt communication approaches accordingly
- Analyse working relationships across cultural and skill-set boundaries and identify patterns that support or hinder effective collaboration
- Combine soft skills and communication skills to communicate effectively in differing contexts within the health field

c) Social and personal competence

Students are able to:

Recognise their own cultural patterns and assumptions and adapt their behaviour to respond constructively to others' cultural expectations

Demonstrate increased cultural and emotional intelligence, tolerance for ambiguity, and cross-cultural empathy

Develop written and verbal presentation skills and demonstrate effective group-work, questioning, and listening

Applicability in this and other Programs

This module benefits students across health, engineering, and management programmes preparing to work in international or multicultural settings.

Entrance Requirements

Fluency in English

Learning Content

1. Definition and scope of intercultural health communication
2. Cultural theories and standardisation models: Hofstede, Hall, Meyer, and others
3. Soft skills and emotional/cultural intelligence in international health environments

4. Organisational culture in international health settings
5. Rhetoric in business and scientific contexts across cultures
6. Intercultural leadership and communication across diverse health teams
7. Cultural sensitivity and strategies for conflict reduction
8. Case studies: applied analysis of intercultural communication challenges in health contexts

Teaching Methods

Group discussions, interactive teaching, case studies, student presentations, self-study, journaling, and selected sessions in a flipped classroom format. Materials are provided via the Moodle learning environment. Additional topics may be incorporated based on current events and group needs.

Recommended Literature

- Hsieh, E. (2021). Rethinking Culture in Health Communication: Social Interactions as Intercultural Encounters. Wiley Blackwell.
- Meyer, E. (2016). The Culture Map. Public Affairs.
- Molinsky, A. (2013). Global Dexterity: How to Adapt Your Behavior Across Cultures. Harvard Business Review Press.
- Nguyen-Phuong-Mai, M. (2020). Cross-cultural Management: with Insights from Brain Science. Routledge.
- Spieldenner, A.R. & Toyosaki, S. (2020). Intercultural Health Communication. Peter Lang.

DGPH- COLLABORATIVE SYSTEMS

Module code	GPH-
Module coordination	Prof. Dr. Dominik Böhler
Course number and name	GPH- Collaborative Systems
Lecturers	Prof. Dr. Dominik Böhler
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

In this module students will recognize different devices and services used for Digital Collaborative Systems in Healthcare. They will identify and apply health IT in details. Students will understand the differences between hardware devices and software. They will analyze different systems and recognize their application in primary, secondary and tertiary healthcare. Students will demonstrate knowledge about the significance of current research in the field of Collaborative Systems by writing a research paper.

After completing the module, the students will have achieved the following learning objectives:

Professional competence

Students

- Understand different Types of Health Information Technology
- Understand the application of different types of Health Information Technology
- understand Big Data and eHealth

Methodological competence

Students

- Discuss the importance of Collaborative Systems in Healthcare
- Analyze the different types of Health Information Technology

- Apply different devices in online scenarios

Social and Personal competence

Students, in a team, develop joint project goals and research papers. They will be able to reflect on their working results and evaluate them.

Applicability in this and other Programs

The module can be used in other study programs related to IT in healthcare and healthcare in general.

Entrance Requirements

none

Learning Content

- Electronic Health Record (EHR)
- Personal Health Record (PHR)
- Health Information Exchange (HIE)
- Medical Interaction Platforms
- Collaboration in Healthcare across Borders
- eHealth / mHealth
- Health Technology Infrastructure
- Telemedicine
- Ambient Assisted Living
- Teletherapy
- Telemonitoring
- Foundations of Big Data
- Data Classification
- Data Analytics in eHealth

Teaching Methods

Online flipped classroom. Content (live lecture, recorded lecture, external videos, literature) is provided on a collaborative online platform. For each lecture a questionnaire is provided which is not mandatory yet allows students to control their knowledge.

Recommended Literature

- Electronic Health Records (EHR) Authors: Tom Seymour, Minot State University, USA Dean Frantsov, Minot State University, USA Tod Graeber, Minot State University, USA
- The value of health information exchange Authors: Joshua Richardson, Erika L. Abramson, Rainu Kaushal
- A_Distributed Collaborative Platform for Personal.pdf Authors: Ahmed M. Elmisery, Seungmin Rho, and Dmitri Botvich
- Telemedicine across borders: A systematic review of factors that hinder or support implementation Authors: Helena Legido-Quigley, Ain Aaviksoo, Josip Car, Martin Mckee • Longbing Cao. 2017. Data Science: A Comprehensive Overview. ACM Comput. Surv. 50, 3, Article 43 (June 2017), 42 pages.
- • Hanrahan, Pat. 2012. Analytic database technologies for a new kind of user: the data enthusiast. In Proceedings of the 2012 ACM SIGMOD International Conference on Management of Data (SIGMOD '12).
- • Grabovschi, C., Loignon, C. & Fortin, M. Mapping the concept of vulnerability related to health care disparities: a scoping review. BMC Health Serv Res 13, 94 (2013).

GPH-15 LIFE SCIENCE FOR PUBLIC HEALTH

Module code	GPH-15
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-15 Life Science for Public Health
Lecturers	Prof. Dr. Sabine Dittrich
Semester	1
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Presentation 15min.
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Public health professionals work daily with tools and data rooted in molecular biology and immunology: diagnostic tests, vaccines, AMR markers, genomic surveillance. This module builds the scientific literacy needed to understand these foundations, enabling students to critically interpret molecular and immunological data, assess diagnostic and vaccine innovations, and engage more informedly in discussions about public health tools and evidence.

Learning Objectives

a) Professional competence

Students are able to:

Explain the basics of cell biology, DNA, RNA, and protein synthesis as the molecular foundation of life science

Describe the principles of the human immune system and how immunological mechanisms are exploited for vaccines, diagnostics, and epidemiological surveillance

Distinguish between different categories of disease-causing agents and explain the implications for diagnostic, surveillance, and vector control approaches

Understand the basics of antimicrobial resistance at the molecular level and its relevance to public health monitoring

b) Methodological competence

Students are able to:

- Critically review scientific data linked to molecular and immunological diagnostics
- Identify the most appropriate surveillance tools for a given epidemiological question (vaccine coverage, source identification, immunity assessment)
- Evaluate emerging biotechnological concepts (e.g. gene-drive, CRISPR, precision health) and their potential public health applications

c) Social and personal competence

Students are able to:

Engage in open and respectful group discussion of complex scientific topics, drawing on the team's diverse backgrounds

Present a self-selected emerging topic in life science and public health to the group in a structured format

Applicability in this and other Programs

This module is relevant to global public health students and others interested in the molecular underpinnings of public health tools and surveillance.

Entrance Requirements

None.

Learning Content

1. Basics of DNA, RNA, and protein synthesis: the molecular foundation of life
2. Molecular and immunological concepts linked to disease markers and antimicrobial resistance
3. Diagnostic methods in public health: molecular (PCR, sequencing) and immunological (serology, ELISA) approaches
4. Vaccines and immunity: mechanisms, types, and use in epidemiological surveillance
5. Vector-borne diseases and vector control: molecular tools for monitoring and intervention
6. Emerging biotechnological concepts in public health: epigenetics, gene-drive, CRISPR, precision health

7. Student presentations: emerging topics in life science and global public health

Teaching Methods

Lectures, structured learning tasks, web-based discussions and student presentations on emerging topics, independent study, and group discussion. Materials are provided via the Moodle learning environment.

Recommended Literature

- Alberts, B. et al. (2019). Essential Cell Biology (5th ed.). W.W. Norton & Company.
- Murray, P.R., Rosenthal, K.S. & Pfaller, M.A. (2020). Medical Microbiology (9th ed.). Elsevier.
- WHO (2023). Antimicrobial Resistance: Global Report on Surveillance.
<https://www.who.int/antimicrobial-resistance>

GPH-13 RESEARCH METHODS & WRITING SKILLS

Module code	GPH-13
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-13 Research Methods & Writing Skills
Lecturer	Prof. Dr. Sabine Dittrich
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Präsentation 15 Min.
Duration of Examination	15 min.
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Research is the foundation of evidence-based public health practice. This module equips students with the theoretical knowledge and practical skills to design, conduct, and communicate rigorous research in global public health. Moving from problem identification through study design, data collection, analysis, and writing, students develop the capacity to engage critically with the research literature and to produce methodologically sound work. A central feature is the GPH Mini-Conference, where students present their research pitches to peers, first-semester students, and invited guests, bridging learning with authentic scientific communication.

Learning Objectives

a) Professional competence

Students are able to:

- o Understand and apply the research process from problem identification through study design to data collection, analysis, and reporting
- o Distinguish between qualitative and quantitative research paradigms and select appropriate designs for specific public health questions
- o Apply principles of validity, reliability, and reproducibility in the design of data collection instruments

- o Understand and apply ethical considerations in research, including participant protection, data integrity, and research governance
- o Use referencing and bibliographic management tools correctly and consistently

b) Methodological competence

Students are able to:

- o Formulate a focused, research-worthy question and translate it into a feasible research objective
- o Apply Logical Framework Analysis (LogFrame) and Problem Tree methodologies for project planning
- o Process and display qualitative and quantitative data appropriately in research reports
- o Write a research proposal with all standard components, and produce output for academic, policy, and lay audiences

c) Social and personal competence

Students are able to:

- o Present research ideas in a structured, evidence-informed format at the GPH Mini-Conference
- o Give and receive constructive feedback on research designs and proposals in a professional manner
- o Collaborate across disciplinary and cultural backgrounds to shape and refine research questions

Applicability in this and other Programs

This module is directly preparatory for the Master's thesis (GPH-13 Master's Thesis Research & Tutorial) and underpins all empirical work in the program. Skills are transferable to careers in public health research, international health organisations, health policy, and academia.

Entrance Requirements

GPH-8 Epidemiology and Health Data Analytics is strongly recommended.

Learning Content

- o Introduction to research thinking: what is research? The research process; identifying a research problem
- o Identifying a research-worthy topic: narrowing scope, formulating objectives, introduction to research design

- o Qualitative research designs: grounded theory, ethnography, phenomenology, case study; worked examples
- o Quantitative research designs: experimental, quasi-experimental, cross-sectional, cohort, case-control; worked examples
- o Data collection methods: surveys, interviews, focus groups, secondary data; validity, reliability, and ethics
- o Sampling strategies: probability and non-probability approaches; sample size considerations
- o Monitoring and evaluation: Problem Tree analysis, Logical Framework (LogFrame)
- o Bibliographic management and referencing: citation systems and academic integrity
- o Data processing and presentation: handling qualitative and quantitative data; formatting results
- o Research writing I the research report: structure, components, and differences between academic, policy, and lay formats
- o Research writing II policy briefs and scientific abstracts: drafting, peer review, and revision
- o Writing a research proposal: components, scheduling, and planning
- o GPH Mini-Conference: student research pitches with peer and faculty feedback
- o Guest lecture: research in practice (e.g. international rabies research, Friedrich Loeffler Institut)

Teaching Methods

Participatory, practice-oriented sessions combining short input lectures with structured group discussions, case study analysis, and writing exercises. Students submit and peer-review written work anonymously. The GPH Mini-Conference provides authentic scientific communication experience. A guest lecture connects classroom learning to active field research. Materials are provided via the Moodle learning environment.

Recommended Literature

- o Kumar, R. (2019). Research Methodology: A Step-by-Step Guide for Beginners (5th ed.). SAGE Publications.
- o Greenhalgh, T. (2019). How to Read a Paper: The Basics of Evidence-Based Medicine (6th ed.). Wiley-Blackwell / BMJ Books.
- o Hulley, S.B. et al. (2013). Designing Clinical Research (4th ed.). Lippincott Williams & Wilkins.

- o Patton, M.Q. (2014). Qualitative Research and Evaluation Methods (4th ed.). SAGE Publications.



GPH- SCIENTIFIC WRITING TUTORIAL

Module code	GPH-
Module coordination	Prof. Dr. Sabine Dittrich
Semester	3
Duration of the module	1 semester
Module frequency	annually
Course type	Required course
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of examination	Written assignment (PStA)
Duration of examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

The Scientific Writing Tutorial accompanies students through the final phase of their Master's programme, supporting the completion of the thesis while developing advanced skills in scientific communication, critical reflection, and professional identity. This module is designed to help students sharpen and finalise their thesis research focus, navigate the challenges of the writing process, and emerge ready to articulate their expertise confidently in the global public health job market. Topics span instrument development, ethics, result interpretation, oral defense preparation, academic publishing, and preparing to start a successful career including foundational leadership and self-management skills for early career professionals. A signature feature is the structured tutorial format: group sessions combined with individual consultation slots ensure each student receives personal, responsive support at the most demanding stage of their studies.

Learning Objectives

a) Professional competence

Students are able to:

- o Apply advanced scientific writing principles to the completion of their Master's thesis: argumentation, structure, formatting, and referencing
- o Sharpen and finalise their thesis research question and design in response to supervisor and peer feedback

- o Critically evaluate their own work and that of peers, providing structured and constructive written and verbal feedback
- o Understand the processes of academic peer review, journal submission, and conference presentation
- o Articulate their research and professional value to academic examiners, policy audiences, and potential employers

b) Methodological competence

Students are able to:

- o Design and critically reflect on a data collection instrument in the context of their specific research question
- o Interpret results within the broader public health literature, distinguishing between findings and their implications
- o Prepare for an oral thesis defense: organise arguments, anticipate examiner questions, and communicate findings with confidence
- o Manage thesis writing timelines and develop self-directed strategies to overcome setbacks and late-stage challenges

c) Social and personal competence

Students are able to:

- o Reflect systematically on their development as researchers and professionals through three structured reflective practice prompts across the semester
- o Identify transferable skills from the GPH programme and articulate them in the context of career opportunities in global public health
- o Apply foundational leadership and self-management principles: giving and receiving feedback, managing under pressure, and working across organisational boundaries
- o Navigate the emotional and intellectual demands of the thesis process, including uncertainty, perfectionism, and competing pressures

Applicability in this and other Programs

This module is designed for Semester 3 students enrolled in the Master's thesis module and is therefore restricted to GPH students in their final semester. The scientific communication, leadership, and reflective practice skills developed are directly applicable to careers in research, international health organisations, public health policy, programme management, and beyond.

Entrance Requirements

Completion of Semester 1 and 2 modules. Enrolment in the Master's thesis module is required.

Learning Content

1. Orientation and thesis focus: module overview, thesis progress review, collecting challenges; sharpening the research question and study design
2. Research questions and framing: group discussion of challenges; individual consultation slots
3. Developing a data collection instrument: design principles, pitfalls, and peer feedback. Reflective Practice 1: 'Where am I, what support do I need?'
4. Milestone self-assessment: evaluating personal timeline and risks; individual consultation
5. Ethical considerations: applying ethical frameworks to individual thesis projects
6. Understanding and responding to feedback: interpreting unclear supervisor or reviewer feedback
7. Interpreting results seeing the bigger picture: from data to meaning to implications. Reflective Practice 2: 'What have I learned, how do I orientate myself for the job market?'
8. Onsite Journal Club at ECRI: academic peer review and critical appraisal of a published article
9. Publishing and conference presentation: how academic publication works; writing a conference abstract; poster and oral presentation norms
10. Oral thesis defense preparation: structure, examiner expectations, common questions, handling pressure
11. 5-minute thesis updates: brief structured update from all students; peer learning across diverse projects
12. Preparing for the world of work: translating GPH skills to the job market; foundational leadership and self-management for early career professionals; networking and positioning in global public health
13. Writing, formatting, and the final stretch: late-stage writing challenges. Reflective Practice 3: 'How much have I learned since starting technically and about myself?'
14. Closing session: reflection on three semesters of the GPH programme; professional next steps and continuing development

Teaching Methods

The tutorial format defines this module. Each weekly session combines a facilitated group discussion focused on a shared theme or challenge followed by individual consultation slots bookable in advance. Students are expected to arrive at each session prepared with their own challenges or questions. Materials and consultation booking links are provided via the Moodle learning environment.

Recommended Literature

- o Glasman-Deal, H. (2010). Science Research Writing for Non-Native Speakers of English. Imperial College Press.
- o Silvia, P.J. (2019). How to Write a Lot: A Practical Guide to Productive Academic Writing (2nd ed.). American Psychological Association.
- o Murray, R. (2017). How to Write a Thesis (4th ed.). Open University Press / McGraw-Hill.
- o Sword, H. (2012). Stylish Academic Writing. Harvard University Press.
- o Ibarra, H. (2003). Working Identity: Unconventional Strategies for Reinventing Your Career. Harvard Business School Press.
- o Equator Network. Reporting guidelines for health research (CONSORT, STROBE, PRISMA). <https://www.equator-network.org>

GPH-13 MASTER 'S THESIS RESEARCH & TUTORIAL

Module code	GPH-13
Module coordination	Prof. Dr. Sabine Dittrich
Semester	
Duration of the module	0 semester
Module frequency	annually
Course type	
Level	
Semester periods per week (SWS)	0
ECTS	30
Workload	Time of attendance: 0 hours Total: 0 hours
Type of Examination	Defense, master thesis
Weighting of the grade	
Language of Instruction	

Module Objective

The Master's thesis is the culminating academic achievement of the GPH programme. It demonstrates that students can independently define a research problem, apply appropriate methods, generate original findings, and communicate these in a professional scientific format. Students are guided through each stage of the research process from topic selection and ethical approval through data collection, analysis, writing, and oral defense developing the skills of an independent, rigorous, and reflective researcher.

Learning Objectives

a) Professional competence

Students are able to:

- o Select and justify a thesis topic relevant to global public health and aligned with their professional development goals
- o Design and execute an original research project applying appropriate qualitative or quantitative methods
- o Make appropriate and consistent use of the scientific literature and reference it correctly
- o Produce a clearly structured, logically argued, and professionally written thesis
- o Present and defend their research at different stages to peers and at the final oral defense

b) Methodological competence

Students are able to:

- o Identify an adequate data collection and analysis method appropriate to their research question
- o Select and justify the study population and sampling approach
- o Apply ethical frameworks and obtain appropriate approvals for their research
- o Assess projects critically and provide constructive feedback to support peers' research development

c) Social and personal competence

Students are able to:

- o Manage an independent long-term research project, including self-directed planning, time management, and navigating setbacks
- o Incorporate constructive criticism from supervisors and peers into an iterative writing and revision process
- o Reflect on their growth as researchers and communicate their thesis work to diverse audiences

Applicability in this and other Programs

This module is restricted to students in Semester 3 of the GPH programme who have completed all other required modules.

Entrance Requirements

Successful completion of all other required modules, including GPH-13A Research Methods and GPH-13B Scientific Writing Tutorial.

Learning Content

1. Independent preparation and execution of the thesis: topic selection, literature review, study design, data collection and analysis, writing, and submission
2. Tutorial guidance across thesis stages: problem analysis and structuring; research design and methods; sampling and data strategies; citation and academic integrity; scientific writing and formatting
3. Participation in the GPH Mini-Conference: presenting work-in-progress to peers and first-semester students
4. Oral defense preparation and execution

Teaching Methods



Independent research under supervisor guidance, supported by the Scientific Writing Tutorial (GPH-13B). Regular individual consultation sessions, participation in the GPH Mini-Conference, and a final oral defense. Seminar-style group workshops are offered at key stages of the thesis process.

Recommended Literature

- o Kumar, R. (2019). Research Methodology: A Step-by-Step Guide for Beginners (5th ed.). SAGE Publications.
- o Boland, A. et al. (2017). Doing a Systematic Review: A Student's Guide (2nd ed.). SAGE.
- o Booth, A. et al. (2016). Systematic Approaches to a Successful Literature Review (2nd ed.). SAGE.
- o Gopen, G.D. & Swan, J.A. (1990). The science of scientific writing. American Scientist, 78(6), 550-558.
- o Murray, R. (2017). How to Write a Thesis (4th ed.). Open University Press.

GPH- BIOSTATISTICS

Module code	GPH-
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH- Biostatistics
Lecturers	N.N.
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Portfolio
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Building on the epidemiological and data science foundations established in GPH-8, this module develops students' applied biostatistical competence for global public health research and practice. The emphasis throughout is on doing rather than deriving: students work directly with real and simulated health datasets, applying statistical methods in R with the support of generative AI tools as a learning aid. By the end of the module, students are equipped to conduct, interpret, and critically evaluate the statistical analyses that underpin public health evidence — and to communicate their findings clearly to both specialist and non-specialist audiences.

Learning Objectives

a) Professional competence

Students are able to:

Apply core biostatistical methods to public health data: descriptive statistics, probability distributions, hypothesis testing, confidence intervals, and measures of association

Select appropriate statistical tests for a given research question and data type, and justify their choice

understand basic predictive modeling techniques

Critically appraise the statistical methods and reporting in published public health and clinical research

b) Methodological competence

Students are able to:

- Import, clean, and structure health datasets in R and carry out reproducible statistical analyses
- Use generative AI tools appropriately as a coding and learning aid, while critically evaluating AI-generated outputs for statistical correctness
- Visualise statistical results effectively and adapt the communication of findings to different audiences
- Document their own statistical learning process and reflect on the development of their analytical competence across the module

c) Social and personal competence

Students are able to:

- Present statistical findings and methodological choices clearly and confidently to a peer audience
- Engage constructively with feedback on analytical work and revise their approach accordingly
- Reflect honestly on their starting point, progress, and remaining challenges in applied biostatistics

Applicability in this and other Programs

This module directly supports students undertaking quantitative Master's thesis research and is relevant to all GPH students seeking to strengthen their applied statistical competence. It builds explicitly on GPH-8 Epidemiology and Health Data Analytics and complements GPH-13A Research Methods.

Entrance Requirements

GPH-8 Epidemiology and Health Data Analytics is required. Basic familiarity with R is recommended.

Learning Content



8. Review and extension of core concepts from GPH-8: data types, distributions, and descriptive statistics in R
9. Probability and statistical inference: sampling distributions, hypothesis testing, p-values, and confidence intervals
10. Comparing groups: t-tests, ANOVA, chi-square tests, and non-parametric alternatives — selection criteria and application
11. Measures of association and effect size: relative risk, odds ratios, and their confidence intervals in health data
12. Simple and multiple linear regression: model building, assumptions, diagnostics, and interpretation
13. Logistic regression for binary health outcomes: model fitting, odds ratios, and prediction
14. Introduction to survival analysis: Kaplan-Meier curves and the log-rank test in public health contexts
15. Using R for reproducible analysis: scripting, workflows, and using generative AI as a coding aid
16. Data visualisation for statistical communication: principles and applied practice in R
17. Critical appraisal of statistical reporting in published public health research
18. Student presentations: applying biostatistical methods to a self-selected or provided health dataset

Teaching Methods

The module is delivered in a block format. Face-to-face sessions combine short input lectures with hands-on data exercises in R; online sessions provide guided self-directed practice supported by video resources and generative AI tools. Students work with real and simulated health datasets throughout. The module concludes with a presentation day in which students present their applied analyses to the group. The learning journal is maintained progressively across the module, documenting starting point, development, and final competence. Materials are provided via the Moodle learning environment.

Recommended Literature

- Kirkwood, B.R. & Sterne, J.A.C. (2003). Essential Medical Statistics (2nd ed.). Blackwell Science.
- Batra, N. et al. (2021). The Epidemiologist R Handbook. <https://epirhandbook.com/en/>
- Vittinghoff, E. et al. (2012). Regression Methods in Biostatistics (2nd ed.). Springer.
- Greenhalgh, T. (2019). How to Read a Paper (6th ed.). Wiley-Blackwell / BMJ Books.
- Wickham, H. & Golemund, G. (2017). R for Data Science. O'Reilly Media. <https://r4ds.had.co.nz/>

GPH- ENTREPRENEURSHIP FOR GLOBAL MARKETS

Module code	GPH-
Module coordination	Prof. Dr. Dominik Böhler
Course number and name	GPH- Entrepreneurship for Global Markets
Lecturers	Prof. Dr. Dominik Böhler
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Presentation
Duration of Examination	15min
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Building Digital Health Products and Business Models requires detailed understanding of both user and medical needs. Developing a personal vision and a product concept based within complex healthcare systems is challenging. Students in this course learn the basic tools for developing digital products and product teams. Herein they will lead an agile product development team developing a functional digital health application based on real customer and user needs.

After completing the module, the students will have achieved the following learning objectives:

Professional competence:

- Understanding Product Management as a role
- Developing skills necessary to manage an agile team
- Designing and Testing Business Models

Methodological expertise:

- Applying agile project work in a practical context
- Applying tools and methods from the business design toolbox

Personal competence:



- Experiencing leading and coaching a cross-functional team
- Managing across cultures and disciplinary boundaries

Social competence:

- Understanding how to solve conflict in diverse teams
- Presenting and pitching a personal product vision

Applicability in this and other Programs

Entrance Requirements

Learning Content

Students will join a cross-functional team developing a digital health product. They will work in the role of a product manager, who is designing and developing the product vision. This includes building and aligning a team across a specific product vision and managing the testing process with real users and customers in a hypothesis-driven framework. The teams will follow a 2-week sprint pattern in their agile development process. During a mid-term and final presentation, the project work will be graded.

1. Entrepreneurial Mindset
2. Methods and Tools for Business Design
 - a. Lean Startup Methodology
 - b. Design Thinking
 - c. Business Model Generation
3. Sales Strategy and Process in Healthcare
4. Financial Modelling
5. Investment Strategy and Investor Relations for Startups
6. Building Exciting Organizations

Teaching Methods

Combination of lectures, seminars, project work, supervised problem based learning and student presentations

Recommended Literature

- Lewrick, Michael, et al. *Das Design Thinking Playbook : Mit traditionellen, aktuellen und zukünftigen Erfolgsfaktoren*, Versus, 2017. ProQuest Ebook Central,

<https://ebookcentral.proquest.com/lib/th-deggendorf/detail.action?docID=4852944>.

- Bland, David, and Alexander Osterwalder. *Testing Business Ideas*, John Wiley & Sons, Incorporated, 2019. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/th-deggendorf/detail.action?docID=5974984>.
- Osterwalder, Alexander, et al. *Value Proposition Design : How to Create Products and Services Customers Want*, John Wiley & Sons, Incorporated, 2014. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/th-deggendorf/detail.action?docID=1887760>.
- Aulet, Bill. *Disciplined Entrepreneurship Workbook*, John Wiley & Sons, Incorporated, 2017. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/th-deggendorf/detail.action?docID=4826750>.

GPH-18 KNOWLEDGE BASED SYSTEMS

Module code	GPH-18
Module coordination	Prof. Dr. Dominik Böhler
Course number and name	GPH-18 Knowledge Based Systems
Lecturers	Prof. Dr. Dominik Böhler
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Written examination (schrP. 90min)
Duration of Examination	90min
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Knowledge acquisition of the essential methods of the application-oriented field of Artificial Intelligence (AI) and the ability to apply them to the issues of health sciences and professional practice. As an educational goal, students experience the scope of "artificial intelligence" and can generate knowledge using AI methods. Participants become acquainted with the knowledge management process and learn to optimise its sub-processes in the professional environment of the healthcare sector. To do so, they now pay particular attention to "soft factors" and the knowledge culture in their professional environment in the healthcare sector. As a result of the interdisciplinary approach, participants acquire the corresponding methodological competence in knowledge logistics, such as knowledge modelling and knowledge representation, as well as knowledge assessment procedures with an intellectual capital report in order to become a role model and lead knowledge management projects. They can assess the different research directions. After completing the module, students will have achieved the following learning objectives:

Professional competence

Students

Have knowledge of soft factors and knowledge culture, of the knowledge management process, knowledge search, the knowledge representation methods (such as ontologies), knowledge assessment methods (such as intellectual capital report), knowledge management software (such as knowledge portals), chatbots and methods of machine learning (such as neural networks and 4.0 techniques).

Use Information Visualization Methods for Different Data Types

Are able to design interactive visualization systems for data from different application areas

Combine visualization and automated data processing to solve big data Problems

Apply knowledge about main characteristics of human visual perception in information visualization and visual analytic

b) Methodological competence

Students

- know programming with a statistics focused programming language such as R or Python
- can deal with the basic concepts of AI and know which knowledge representation formalisms are appropriate for which problems and can map domains in suitable formalisms.
- can create an implementation to solve a self-chosen problem with the means of machine learning.

c) Social and personal competence

Students are able to:

- can implement their own knowledge-based ideas and defend them against competing approaches.
- Deepen their problem-solving skills through group work and team work

Applicability in this and other Programs

The module can be used in other study programs related to healthcare.

Entrance Requirements

Recommended: Basic understanding of R or Python, e.g. for data visualization

Learning Content

- Statistical Learning
- Linear Regression
- Classification
- Resampling Methods
- Linear Model Selection
- Moving Beyond Linearity
- Tree-based Methods
- Support Vector Machines
- Deep Learning
- Survival Analysis and Censored Data
- Unsupervised Learning
- Multiple Testing

Teaching Methods

The module provides a framework for self-organised learning in order to support students in the reflection and further development of professional, methodological and social competencies. In addition to theoretical inputs, interaction exercises, problem-solving tasks and role-plays are also used as the key methods. Guided feedback sessions sensitise students to their communication style, their role behaviour in groups, and the conditions for successful collaboration.

Recommended Literature

T. Hastie, R. Tibshirani, and J. Friedman. An Introduction to Statistical Learning. Springer Series in Statistics Springer New York Inc., New York, NY, USA, (2021)

Russell, Stuart, Norvig, Peter, Artificial Intelligence: A Modern Approach, The Intelligent Agent Book, Prentice Hall, 2003

GPH-5 OUTBREAKS, EPIDEMICS AND PANDEMICS

Module code	GPH-5
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH-5 Outbreaks, Epidemics and Pandemics
Lecturers	Prof. Dr. Sabine Dittrich
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Research Paper (PStA)
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Outbreaks and pandemics represent some of the most complex and consequential challenges in global public health. This module examines how infectious disease events emerge, spread, are detected, and are controlled, with a focus on the role of early warning and response systems (EWRS). Students develop the skills to assess alerts, understand the legal and institutional frameworks governing responses, and critically learn from past and recent outbreak events.

Learning Objectives

a) Professional competence

Students are able to:

- Explain the biological, social, and environmental drivers of disease transmission and outbreak emergence
- Describe the structure and function of national and international EWRS, including the International Health Regulations (IHR)
- Assess the precautions, interventions, and public health measures used in outbreak control at local and global levels
- Critically analyse past outbreaks and pandemics to extract transferable lessons for future preparedness

b) Methodological competence

Students are able to:

- Evaluate disease alerts within an EWRS framework and propose proportionate response actions
- Structure standardised and defensible decision-making processes for rapidly evolving outbreak scenarios
- Assess the capacity and limitations of national and global infrastructures for outbreak alert and response

c) Social and personal competence

Students are able to:

- Work effectively in a team to analyse and respond to a simulated outbreak scenario across diverse cultural and technical backgrounds
- Communicate outbreak risk and response decisions clearly to different stakeholder audiences

Applicability in this and other Programs

This module is relevant to all health-related programmes and to students interested in infectious disease, health security, or global health emergency preparedness.

Entrance Requirements

None. GPH-1 and GPH-8 are recommended.

Learning Content

1. Disease transmission and outbreak drivers: biological, social, environmental, and zoonotic factors
2. Early warning and response systems (EWRS): structure, processes, and risk assessment frameworks
3. International Health Regulations (IHR) and other legal frameworks governing outbreak response
4. Outbreak investigation: standardised processes, case definitions, and field epidemiology methods
5. Outbreak control measures: infection prevention, contact tracing, quarantine, and risk communication
6. Case studies: historical and recent outbreaks and pandemics – analysis and lessons learned

7. Simulation exercise: assessing an alert and drafting a response within a defined EWRS framework

Teaching Methods

Lectures, learning tasks, web-based discussions, independent study, seminars, and a group outbreak simulation exercise drawing on real-world EWRS frameworks. Guest lectures from field practitioners where available. Materials are provided via the Moodle learning environment.

Recommended Literature

- Morens, D.M. & Fauci, A.S. (2020). Emerging pandemic diseases: how we got to COVID-19. *Cell*, 182(5), 1077–1092.
- WHO (2016). *International Health Regulations* (3rd ed.). WHO Press.
- Fineberg, H.V. (2014). Pandemic preparedness and response – lessons from H1N1. *New England Journal of Medicine*, 370, 1335–1342.
- ECDC. Epidemic Intelligence resources. <https://www.ecdc.europa.eu>

GPH- SUSTAINABLE DEVELOPMENT AND HEALTH

Module code	GPH-
Module coordination	Prof. Dr. Sabine Dittrich
Course number and name	GPH- Sustainable Development and Health
Lecturers	Prof. Dr. Sabine Dittrich Prof. Dr. Roland Augustin
Semester	2
Duration of the module	1 semester
Module frequency	annually
Course type	Elective
Level	Postgraduate
Semester periods per week (SWS)	4
ECTS	5
Workload	Time of attendance: 60 hours self-study: 90 hours Total: 150 hours
Type of Examination	Oral examination
Duration of Examination	
Weighting of the grade	5/90
Language of Instruction	English

Module Objective

Access to clean and affordable energy as well as broader engineering infrastructure is directly linked to health outcomes for billions of people globally. This interdisciplinary module connects SDG 7 (Affordable and Clean Energy) with SDG 3 (Good Health and Wellbeing), bringing together health and engineering students for shared learning. Students examine the individual and population health consequences of infrastructure poverty, conduct practical indoor pollution experiments at ECRI, and develop transversal skills to bridge the language and methods of health and engineering.

Learning Objectives

a) Professional competence

Students are able to:

- Explain the connections between SDG 7 and SDG 3 and the broader SDG interdependency landscape
- Describe the health impact of energy poverty, lack of clean energy access, and indoor air pollution at household and population level
- Understand the link between climate change, energy supply improvements, and global health and mortality indicators

- Apply WHO action plans and ISO standards relevant to indoor and outdoor pollution monitoring in health contexts

b) Methodological competence

Students are able to:

- Monitor global health indicators and connect them to energy-related determinants
- Plan and conduct quantitative experiments measuring indoor/outdoor pollution based on WHO and ISO guidance
- Review, assess, and synthesise scientific and technical literature linking energy provision to health outcomes
- Draft a briefing document linking practical measurements to WHO models (e.g. HOMES) and their health consequences

c) Social and personal competence

Students are able to:

- Learn and collaborate in a multidisciplinary team, bridging health and engineering perspectives
- Reflect on the connection between individual technical work and broader societal and health consequences

Applicability in this and other Programs

This module is relevant to GPH and engineering (ESE) students with an interest in the connections between energy systems, climate, and global health. Onsite participation in practical sessions is required.

Entrance Requirements

None.

Learning Content

1. The SDG landscape: connections between SDG 7 and SDG 3 and cross-SDG interdependencies
2. Health impacts of energy poverty: mortality, respiratory disease, and maternal and child health
3. Climate change, energy provision, engineering infrastructure and health: pathways and evidence
4. WHO action plan on energy and health; ISO standards for pollution monitoring

5. Introduction to public health concepts for engineering students; introduction to energy concepts for health students
6. Experimental design for indoor pollution measurement: planning based on ISO and WHO standards
7. Practical sessions at ECRI: establishing a 'cooking hut' and measuring pollution indicators from different fuel sources
8. Briefing document: connecting measurement data to WHO models and health impact estimates

Teaching Methods

The module is split into a theoretical half (lectures, group work, literature review) and a practical half (experimental planning and hands-on pollution measurement sessions at ECRI). Materials are provided via the Moodle learning environment.

Recommended Literature

- WHO (2021). WHO Global Air Quality Guidelines. World Health Organization.
- Fullerton, D.G., Bruce, N. & Gordon, S.B. (2008). Indoor air pollution from biomass fuel smoke is a major health concern in the developing world. Transactions of the Royal Society of Tropical Medicine and Hygiene, 102(9), 843–851.
- Forbes article: Engineers Are Unsung Heroes Of Global Health (<https://www.forbes.com/sites/madhukarpai/2022/05/22/engineers-are-unsung-heroes-of-global-health/>)
- UN Sustainable Development Goals. SDG 7 resources. <https://sdgs.un.org/goals/goal7>