Interdisciplinary School of Health Sciences

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SYLLABUS

Master of Science Health Sciences

(MSc. Health Sciences)

PROGRAMMES

M.Sc. Health Sciences programme

Background

The purpose of the Master of Health Sciences programme is to provide theoretical and practical knowledge of public health biology. The teaching programme intends to create a cadre of health scientists who have interdisciplinary knowledge and skills from epidemiology, microbiology, immunology, biochemistry, genetics and nutrition. The practical component of the course includes laboratory skills as well as extensive field training in applied epidemiological research methods.

Goal and Objectives of the M.Sc. Health Sciences Programme

The goal of the programme is to develop human resource with an understanding of the recent advances and needs in the field of public health biology.

Objectives of the programme:

- To impart theoretical and practical knowledge in the field of public health biology
- To develop ability to use methods and techniques of various life sciences disciplines in the field of public health
- To develop the critical ability to analyse and understand the public health issues and undertake research to enhance evidence based decision making

Organisation of the revised M.Sc. Health Sciences course

The revised M.Sc. Health Sciences curriculum, will use an interdisciplinary approach, integrating knowledge and practice across disciplines to address public health challenges.

M.Sc. Health Sciences degree programme is divided into four semesters. The curriculum is composed of several core and elective courses.

The Core Courses

The core courses lay basic foundation of and comprehensive introduction to public health biology. The core courses are organized under following themes;

1. Courses covering epidemiological methods; quantitative research methods, research design and evaluation
2. Biology based courses like immunology, pharmacology & toxicology, nutrition and metabolism
3. Practical components include laboratory-based skills in the disciplines of microbiology, biochemistry, and field practical training in the methods and techniques of nutrition and dietetics

Elective Courses

The elective courses in Health Sciences continue to emphasize interdisciplinary knowledge as well as complementary to the core knowledge of public health. Therefore, M.Sc. Health Sciences programme has several options that allow the curriculum to be tailored to the needs of a student.

M.Sc. Health Sciences Course Structure

Core Courses			Elective Courses		
Subject Code	**Subject Title**	**Number of Credits**	**Subject Code**	**Subject Title**	**Number of Credits**
Semester I			**Semester I**		
SHS101	Introduction to Public Health	4	NONE		
SHS102	Basics of Epidemiology	4			
SHS103	Introduction to Biostatistics	4			
SHS104	Introduction to Nutrition	3			
SHS105	Demography	1			
SHS106	Human Physiology	4			
SEMESTER II			**SEMESTER II**		
Core Courses			**Elective Courses**		
SHS201	Infectious Disease Control	4	SHS205	Nutrition and Public Health	4
SHS202	Immunology in Health and Disease	4	SHS206	Health Behaviour	2
SHS203	Epidemiology Practicals	4	SHS207	Integrative Health	3
SHS204	Laboratory Methods in Health Sciences I	4	SHS 208	Ageing and Society	2
			SHS 209	Global Health Case Studies	1

SEMESTER III			**Semester III**		
Core Courses			**Elective Courses**		
SHS301	Non-communicable Diseases, Injuries and Control Programmes	4	SHS305	Basics of Pharmacology	2
SHS302	Human Genetics	4	SHS 306	Internship	2
SHS303	Maternal and Child Health	4	SHS307	Nutrition Research Methods and Techniques	4
SHS304	Laboratory methods in Health Sciences II	4	SHS308	Disaster Management and Outbreak Investigation	1
SEMESTER IV			**Semester IV**		
Core Courses			**Elective Courses**		
SHS401	Clinical and Field Trials	2	SHS406	Disability and Public Health	2
SHS402	Bioethics, Biosafety and regulations	2	SHS407	Critical reading	2
SHS403	Research Project I	4	SHS408	Proposal Development	2
SHS404	Research Project II	4	SHS 409	Monitoring and Evaluation of Public Health Programmes	1
SHS405	Human molecular and cellular biology	4			

Semester I

Subject Code	Subject Title	Number of Credits
Core courses		
SHS101	Introduction to Public Health	4
SHS102	Basics of Epidemiology	4
SHS103	Introduction to Biostatistics	4
SHS104	Introduction to Nutrition	3
SHS105	Demography	1
SHS106	Human Physiology	4

Explanatory note for semester I

The objective of the Semester I is to introduce Health Sciences students to the basic concepts in public health, and provide understanding various determinants of health and disease. It provides knowledge about organizational structure and the functions of public health system, knowledge on the functioning of human body through courses like introduction to public health and human physiology. It also discusses how nutrition and social and behavioural factors determine human health in the course introduction to nutrition and introduction to social epidemiology course respectively. Course on demography is an introductory course to concepts and methods in population sciences. Lastly Epidemiology and Biostatistics courses provide hands on training on research designs, methods of analysis of data and impart skills in presentation and interpretation of health data.

SHS101 Introduction to Public Health :4 credits

Course Objectives:

- To introduce students to the discipline of public health
- To give an overview of the methods of prevention and health promotion
- To understand the determinants and measures of disease and health related states
- To understand the status of health and disease at global and national levels

Course outline:

1. Health, its determinants and public health
2. The science and practice of public health
3. History of public health
4. Disease, its measures and prevention
5. Measures of disease in population
6. Global health and epidemiological transition
7. Sources of global health data
8. Functional organisation of the public health system in India
9. Evolution of global public health initiatives: primary health care, selective primary health care, MDGs, SDGs

Suggested Reading:

1) Class handouts
2) Oxford textbook of Public Health Ed. Roger Detels, James Mcewen, Robert Beaglehole, and Heizo Tanaka Oxford University Press (OUP) 4th Edition: 2002.
3) Public Health at the Crossroads – Achievements and Prospects. Robert Beaglehole and Ruth Bonita 2nd Edition Cambridge University Press
4) Maxcy-Rosenau-Last Public Health & Preventive Medicine, Fourteenth Edition Ed Robert Wallace, MD, et al.
5) Epidemiology and Management for Health Care: Sathe,et al. Popular Prakashan, Mumbai,
6) International Public Health: Diseases, Programs, Systems, and Policies by Michael Merson, Robert E Black, Anne J Mills - Jones and Bartlett Publishers.
7) Preventive and Social Medicine, K Park, Bansaridas Bhanot Publishing House.

SHS102 Basics of Epidemiology: 4 credits

Course Objectives

- To familiarise students on science and methods of epidemiology
- To understand the applications of epidemiology in public health decision making

Course Outline

1. Historical aspects, definition, aim and uses
2. Descriptive epidemiology
3. Risk measurement, Measurement of morbidity and mortality: Incidence, Prevalence, Age-adjustment and survival analysis, use of morbidity and mortality
4. Epidemiological study designs
5. Bias, confounding and interaction
6. Causal association
7. Disease Surveillance system

Suggested reading:

1) Gordis Leon. Epidemiology (Fifth edition) , Elsevier Saunders, 2013.
2) Dona Schneider and David E. Lilienfeld. Lilienfeld's Foundations of Epidemiology, Fourth Edition, Oxford University Press, USA, 2015.
3) Porta Miquel. A Dictionary of Epidemiology, Oxford University Press, USA, 2014
4) Somerville Margaret, et al., Public Health and Epidemiology at a Glance, Second Edition, Wiley-Blackwell, 2016
5) Beaglehole. R. Bonita, et. al Basic Epidemiology, 2nd Edition, WHO Publication, Geneva, 2006.
6) Spassoff R.A. Epidemiologic Methods for Health Policy, Oxford University Press, 1999
7) Barkar, D.J.P., Practical Epidemiology: Churchill pub, Livingstone, 1991.
8) Knox E. G. Epidemiology in health care planning: A Guide to the Uses of a Scientific Method, Oxford University Press, USA.

SHS 103 Introduction to Biostatistics: 4 credits

Theory Credits 2

Course objectives

- To introduce students to the use of bio-statistics in health sciences
- To understand the role of biostatistics as a supportive discipline of epidemiology

Course Outline

1. Introduction to biostatistics: Descriptive and Inductive statistics
2. Describing data: Variables: Nominal, Ordinal and Interval scale variables. Measures of central tendency: Mean (arithmetic, geometric, harmonic) Median, Mode; Merits and demerits of different measures. Measures of dispersion: Range, Variance, Standard Deviation; Merits and demerits of different measures of dispersion. Measures of Skewness and Kurtosis; Graphical presentation of data
3. Introduction to the concept of probability, events; exhaustive, mutually exclusive events; laws of probability, additive and multiplicative laws of probability and its properties
4. Discrete probability distributions: Binomial probability distribution and Poisson distribution and their properties. Continuous probability distribution. Introduction to normal distribution and its properties
5. Sampling methods: Type of sampling, Probability sampling, Non-probability sampling, sample size determination
6. Correlation: Concept of correlation, Pearson correlation coefficient, and its properties; Spearman ranks correlation coefficient
7. Concepts in Inductive statistics: Population, sample parameter, and statistic. Sampling distribution of mean and standard error. Statistical hypothesis, critical region, level of significance, and two types of errors.
8. Test of Significance: T-test for small samples and tests based on normal distribution for large samples. Testing the association of attributes and Chi-square, goodness of fit
9. Nonparametric tests: One sample test, two sample tests, linear regression, multiple linear regressions, one way and two way ANOVA

Biostatistics Practical: 2 Credits

Course Objectives

- To train students in use of statistical software
- To explain use of data in decision making
- To make students aware of pitfalls in statistical analysis

Course outline

1. Introduction to statistical software
2. Working with data: Computing variables, recoding variables, sorting data, grouping data, ensuring quality of data
3. Exploring data: Descriptive statistics, Frequencies, compare means, frequency tables and crosstabs, multiple response analysis
4. Analysing data: Pearson correlation, The Chi-Square Test of Independence, comparing means: One sample t tests, Paired t tests, Independent samples t tests, and One-way ANOVA
5. Multivariate analysis: Linear regression, logistic Regression analysis

Suggested reading:

1) Statistics for Social sciences: T. Rajaretnam, Sage publication. New Delhi 2016
2) Fundamentals of Statistics (Seventh Edition): S.G. Gupta. Himalaya Publication, Mumbai, 2017
3) Introduction to Biostatistics and Research Methods (Fifth Edition): P.S.S. Sundar Rao, J. Richard, Prentice Hall, New Delhi, 2012
4) An Introduction to Biostatistics: A manual for students in Health Sciences: P.S.S. Sundar Rao, J. Richard Prentice Hall, New Delhi, 1996
5) Bio-Statistics: A foundation for Analysis in the Health Sciences: Daniel, W.W., John Wiley and Sons Pub., Canada, 1991.
6) Bio-Statistics: A Manual of statistical methods for use in the Health, Nutrition and Anthropology: K. Vishwas Rao, Jaypee Brothers Medical Pub., New Delhi, 1996.

SHS104 Introduction to Nutrition: 3 credits

Course objective:

- To understand the role of nutrients in the physiological processes

Course outline:

1. Introduction to nutrition, inter relationship between food, nutrients & health. Nutritional Status. Common terms related to nutrition.
2. Energy: Introduction, Physiological fuel value, Basal Metabolic Rate, Total Energy Expenditure, Specific dynamic action, Respiratory Quotient
3. Carbohydrates: Classification, function, sources, RDA & deficiency
4. Fibre – types, role in health and diseases.
5. Lipids: Classification of fatty acids, Function, sources, RDA, & deficiency. Saturated fat, MUFA, PUFA, essential fatty acids, prostaglandins. Cholesterol – introduction, sources, requirement.
6. Proteins: Classification of amino acids. (essential & non- essential), functions of protein, sources, RDA & Deficiency. Evaluation of the protein quality – biological value, protein efficiency ratio, nitrogen retention, net protein utilization.
7. Vitamins: Classification – Fat soluble & water soluble, function, sources, RDA & deficiency.
8. Minerals: Major minerals – Ca, P, Mg, Na, K. Minor minerals – Fe, I, F, Zn, Co, Mn, Se, S, Cr., Function, sources, RDA & deficiency.
9. Water: Role of water in the body, its requirement, extracellular & intracellular fluid, maintenance of water balance

Suggested Reading:

1. Mann, J. and Truswell, S. eds., 2017. Essentials of human nutrition. Oxford University Press.
2. Eastwood, M.A., 2013. Principles of human nutrition. Springer.
3. Bender, D., 2014. An introduction to nutrition and metabolism. CRC Press.

SHS105 Demography: 1 credit

Course objectives:

- To familiarize students to the fundamentals of population studies and its links with health.
- To impart practical knowledge and skills of demographic and health data sources and practical use of data

Course outline:

1. Introduction to population and health: definition, scope, Concept of demography, Population components, Demographic transition theory
2. Sources of demographic and Health data: Population census, Vital registration system, Sample Registration System, National Family Health Survey (NFHS), District Level Health Survey (DLHS), Annual Health Survey(AHS), National Sample Survey Organization (NSSO) (demonstrate the practical use of the data and its advantages and limitations.)
3. Population composition: Levels and trends in the sex and age structure of the population of world and developed and developing countries
4. Concepts, definition, determinants and measurement of fertility, mortality and migration, population projection
5. Life tables: Concept, importance and methods
6. Population policy: Population policy linkages with health issues

Suggested reading:

1) The Springer Series on Demographic Methods and Population Analysis: Ed.: Land, Kenneth C. "The Plenum Series on Demographic Methods and Population Analysis" Durham, NC 27708-0088, USA , 2014
2) Population Studies and Development from Theory to Fieldwork: Petit, Véronique (Ed.) Springer International Publication AG 2018
3) Handbook of Population: Ed. Dudley Poston and Michael Micklin. Springer publication, Edition one, 2006
4) Principles of population Studies: Asha Bhende and Tara Kanitkar, Himalaya Pub, Houses, Mumbai, 2011
5) The methods and Materials of Demography (Second edition): Siegel, Jacob S., and David A. Swanson,: Elsevier Academic Press, San Diego, 2004

SHS 106 Human Physiology: 4 credits

Course objectives:

- To provide an understanding about the structure and function of the human body
- Overview of the pathology of common diseases of public health importance

Course outline:

1. Human life cycle: growth and development, sexuality and conception
2. Cells and tissues of the human body
3. Homeostasis
4. Structure and function of organs and systems; musculo-skeletal, cardiovascular, respiratory, digestive, urino-genital, lymphatic, nervous system and sense organs

Suggested reading:

1) Textbook of Medical Physiology: A. C. Guyton, Prism Books Pvt. Ltd., Bangalore,
2) Anatomy and Physiology for Nurses: R.S. Winwood, J.L. Smith, Education Academic and Medicinal Publishing Division of Hodder and Stoughton, London,
3) Atlas of Anatomy: Casey Horton, Marshall Cavendish Books, London,
4) Basic Clinical Physiology: J.H. Green , Oxford University press, Delhi
5) Samson Wright's Applied physiology: Keele, Neil, *et.al*. (Ed) Oxford University press, Delhi
6) Lehninger, Principles of Biochemistry.

Semester II

Semester II		
Core Courses		
Subject Code	**Subject Title**	**Number of Credits**
SHS201	Infectious Diseases Control	4
SHS202	Immunology in Health and Disease	4
SHS203	Epidemiology Practicals	4
SHS204	Laboratory Methods in Health Sciences I	4
Elective Courses		
Subject Code	**Subject Title**	**Number of Credits**
SHS205	Nutrition and Public Health	4
SHS206	Health Behaviour	2
SHS207	Integrative Health	3
SHS 208	Ageing and Society	2
SHS209	Global Health Case Studies	1

Explanatory note for semester II

The objective of semester II is to expose students to the various common infectious diseases in India and the pathogenesis of these diseases in the Infectious disease control course. The course on immunology enhances their knowledge and understanding about immune system functioning and response in case of different disease conditions Nutrition and public health course is adds to their understanding of the role of nutrition in improving public health. Course on quantitative methods and also on qualitative methods provide practical exposure to different types of methods of epidemiological research. Collection of population data, its management and analysis. Students also learn appropriate computer based skills.

SHS201 Infectious Diseases Control: 4 credits

Course objectives:

- To understand the magnitude and public health implications of infectious diseases
- To understand the epidemiology of infectious diseases
- To understand the biology of pathogens, microbial basis of pathogenesis and the mechanism of action of antibiotics and antivirals
- To understand the pathology, pathogenesis, clinical manifestation, mode of transmission, prevention and control of diseases of bacterial and viral etiology
- To understand the principles of infectious disease control programmes
- To orient students about the national disease control programmes,
- Critical evaluation of various disease control programmes

Course outline

1. General overview of infectious diseases and their impact in developing countries
2. Epidemiology of infectious diseases
3. Overview of immunology
4. Structure of prokaryotic cell, pathogenic modifications
5. Anti-microbial agents, drug resistance
6. Infectious disease control programmes (including agent biology, epidemiology, pathogenesis and pathology, clinical presentation and management; public health strategies and mechanisms)
    a. Vaccine preventable diseases: TB, polio, diphtheria, tetanus, measles.
    b. Respiratory diseases: Tuberculosis, leprosy, ARI's
    c. Intestinal: Diarrhoea, typhoid, worm infestations
    d. Contact: STIs and AIDS
    e. Vector borne: malaria and filaria, JE, dengue,leptospirosis,
    f. zoonotic: plague and rabies

7. Neglected tropical diseases

Suggested reading:

1) Duguid et al. Textbook of Medical microbiology
2) Javetz and Melnick: Adelbergs Medical Microbiology
3) World Health Organization: Report on infectious diseases, and Report on Multidrug resistance, World Health Organization, Geneva
4) Principles and Practice of Medicine: Davidson, Edward, Bouchier et. Al., Pearson Professional Ltd. London
5) Biology of Disease: Jonathan Phillips, Paul Murray, Blackwell Science Ltd. Australia,
6) Human Virology: A textbook of Students of Medicine and Microbiology, Dentistry, Leslie collier, John Oxford, Oxford University Press, Tokyo
7) Textbook of Medicine: Cecil, Bennett, et al., Harcourt Brace Joanvich Inc. U.S.A.
8) Nelson K E: Infectious disease epidemiology: theory and practice
9) Griesecke J : Modern infectious disease epidemiology
10) National Disease Control Programmes websites and class handouts

SHS 202 Immunology in Health and Disease: 4 Credits

Course objectives

- To provide a basic knowledge of the immune response and its involvement in health and disease

Course outline

1. Introduction, basic concepts in immunology, components of the immune system
2. Innate immunity: Different lines and layers of defense, The complement system
3. Adaptive immunity- humoral and cell mediated: The structure of a typical antibody molecule, Interaction between the antibody and specific antigen; Antigen processing and presentation
4. Cytokines and immunomodulation, Hypersensitivity and allergy
5. Vaccines and Vaccination: immunology of selected infectious diseases of public health importance, applications of immunology in diagnosis and management of common diseases
6. Immune system and infectious diseases
7. Autoimmune disorders
8. Immunology and Cancer

Suggested reading:

1) Essential Immunology: - Ivan Roitt, Blackwell scientific publications, London Edinburgh Boston, Australia, 1997.
2) Immunology: Janis Kuby, W.H. Freeman and company, U.S.A.1992
3) Immunobiology: The immune system in health and disease: J. Travers, current biology pub, New York, 1997.
4) Vaccines Prospects and perspectives: Harmindar Sing, Rajesh Bhatia, Forward pub. Co., Delhi, 1993
5) Relevant documents and Suggested texts therein from the WHO website
6) WHO Technical Publications: Vaccines, Human Genetics Program series.
7) Harrison's Principles of Internal Medicine 16th Ed.-2005

SHS 203 Epidemiology Practicals: 4 credits

Course objectives:

- To introduce students to quantitative research methods in public health including issues of ethics and biosafety
- To train students in the method of analysis of data and report writing. The information from this course will be subsequently used for planning health interventions

Course outline:

1. Types of research; steps in conducting research
2. Ethics in research
3. Survey methods and their application to public health research
4. Survey design and planning, sampling, construction of questionnaire,
5. Data collection, analysis
6. Report writing

Suggested reading:

1. Health Research Methodology: A guide for training in research methods. Second Edition. WHO, 2001.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
3. John Creswell (2013). Research Design: Qualitative, Quantitative, and mixed methods
4. approaches. Fourth edition, Sage Publications
5. ICMR, 2016 Ethical Guidelines for Biomedical Research on Human Participants, ICMR, New Delhi.

SHS 204 Laboratory Methods in Health Sciences I: 4 credits

Course objective

- To demonstrate the diagnostic methods that are used for supporting disease control and environmental health activities and the underlying principles

Course outline:

1. Introduction to Lab
2. Microbiology –Basic aseptic techniques and media preparation, spread plate, streak plate Gram staining, microbial growth curve, culture, antibiotic susceptibility testing.
3. Haematological methods: Blood grouping, TBC, WBC, RBC count
4. Biochemistry: glucose estimation, liver function tests; Estimation of haemoglobin
5. Immunology: Ouchterlony Double Diffusion, ELISA
6. Molecular biology: Protein estimation by Biuret, Bradford and Folins Lowry method
7. Environmental measures: Water quality testing

Suggested reading:

1.Textbook of Medical Laboratory Technology, P.B. Godkar, Balani publishing, House Bombay.
2.Basic laboratory Methods in Medical Bacteriology, WHO, Geneva.
3.Basic laboratory Methods in Medical Parasitology, WHO, Geneva

ELECTIVE COURSES

SHS 205 Nutrition and Public Health: 4 credits

Course objectives:

- To understand the global and national burden of nutritional deficiencies
- To identify public health nutrition interventions
- To study the impact of nutritional policies and programmes and nutritional status of the population

Course outline:

1. Introduction to public health nutrition
2. Nutrition Transition: Demographic, economic transition, poverty alleviation, food consumption patterns
3. Undernutrition: global and Indian prevalence of undernutrition, risk factors consequences
4. Micronutrient deficiency disorders: prevalence, risk factors, Interventions that worked globally, lessons learnt.
5. Overnutrition: Evolutionary principle, Obesity: prevalence and risk factors: Physical activity and inactivity, screening of those at nutritional risk, Life style diseases: Interventions that worked globally, lessons learnt.
6. Guidelines for prevention of non- communicable diseases
7. Food Security: Factors affecting food security, economics food security and community development, Food security bill

Suggested reading:

1) Vir S.C., (2015), Public health nutrition in developing countries (Part I and II), Woodhead Publishing India Pvt, Ltd.
2) WHO and Chan, M., (2011) 'Haemoglobin concentrations for the diagnosis of anemia and assessment of severity', Geneva, Switzerland: World Health Organization, Geneva pp. 1–6.
3) Cashman, K. D., Sheehy, T., & O'Neill, C. M. (2018). Is vitamin D deficiency a public health concern for low middle income countries? A systematic literature review. European journal of nutrition, 1-21.

SHS 206 Health Behaviour: 2 credits

Course objectives:

- To introduce students to the factors affecting on health and illness behaviour of population, and methods of behavioural modifications

Course outline:

1.Introduction to health behavior research; attitude, behaviour, perception, risk, self-efficacy and how these concepts used in prevention and health promotion programmes

2.Introduction to health behaviour theories and models: Health Belief Model, Transtheoretical model, Theory of Reasoned Action and Planned Behavior

3.Behaviour change communication: Adherence and Resistance, Motivation and behaviour change, illness, diseases and behaviour change, social and psychological factors contributing to long-term behavioural change

4.Health education: methods of health education interventions, ways of communication, and assessment of impact of health education

5. Health promotion and disease prevention: a) Lay Representations of illness, social and psychological factors involved in the illness experience b) Stress and illness: Stress and Coping, role of social support in stress, coping and health outcome c) Substance use and psychological intervention d) Pain and chronic illness

6. Methods to measure behavioural change: scale development and validation of a scale by taking examples from existing research, when to use scale, analysis of data gathered using scale.

7. Cultural Epidemiology Framework and respective domains: Cultural identity (Domain I), Illness Explanatory Model (Domain II), key social interpersonal relations (Domain III) and relevant societal structural features of the health systems acknowledging the potential impact of social status and political economy (Domain IV)

Suggested reading:

1) Marks D, Murray M, Brian Evans, Estacio EV, Health Psychology. Delhi: sage publication, 2011
2) McDowell Ian, Measuring Health: A guide to relating scales and questionnaires. New York: Oxford University Press, 2006.
3) Scott Kahan, Andrea C. Gielen, Peter J. Fagan, Lawrence W. (eds)Green Health Behavior Change in Populations. USA: JHU Press, 09-Oct-2014
4) Karen Glanz, Barbara Rimer and K. Viswanath (eds) Health Behaviour: Theory Research and Practice. Jossey-Bass, July 2015
5) Prestwich,A. Jared Kenworthy , Mark Conner Health Behavior Change: Theories, Methods and Interventions. London and Newyork: Routledge, 6 October 2017, ISBN-13: 978-1138694811
6) Baranowski, T., Perry, C.L., Parcel, G.S. 2002. How Individuals, Environments, and Health Behavior Interact. In: Glanz, K., Rimer, B.K., Lewis, F.M., editors. Health Behavior and Health Education: Theory, Research, and Practice. 3rd Edition. San Francisco, CA: Jossey-Bass. p. 165-184.

7) Gitlin L., Sara Czaja. Behavioral Intervention Research: Designing, Evaluating, and Implementing. New York: Springer Publishing Company, 2015 ISBN 13 9780826126580
8) Weiss, M. G., (2017). The promise of cultural epidemiology. Taiwanese Journal of Psychiatry, 31(1), 8–24.
9) Weiss M. G. (2018). Cultural Epidemiology: Conceptual framework and current directions of an interdisciplinary field. Bulletin of the Institute of Ethnography SASA

SHS 207 Integrative Health: 3 credits

Course objectives:

- To get an overview of Traditional, Complementary and Integrative Medicine (TCIM)
- To examine the current status of practitioners in India and their interactions with the health system
- To identify potentials and challenges about TCIM in public health context

Course outline:

1. Definitions, plural systems of medicine, Traditional Medicine, Complementary & Integrative Medicine, Global trends and policy framework
2. Introduction to Traditional Medicine: Chinese, Arabic, Greek, Korean, Japanese, African and Ethno-medicine from different parts of the world
3. Indian traditional medicine - AYUSH Systems: Ayurveda, Yoga, Unani, Siddha, Sowa Rigpa, Naturopathy, Homeopathy, Herbal medicine and health traditions
4. Concept of Integrative Health, holistic health, whole systems approaches, personalized health, predictive, preventive, personalized approaches, curative to preventive health care, global initiatives in Integrative Medicine, WHO traditional medicine strategy
5. Historical evolution of integrative medicine in India and key committee reports (e.g. Udupa, Chopra)
6. Current status of practitioners of TCIM in public health in India, national AYUSH mission and other initiatives
7. TCIM: potential and challenges in disease prevention, health promotion, surveillance and care; public health competencies

Suggested reading:

1. Patwardhan B Et al. Integrative Approaches for Health: Biomedical Research, Ayurveda and Yoga. Elsevier, USA, 2015
2. Patwardhan B. Traditional Medicine for Affordable Global Health, A report of CIPIH, World Health Organization, Geneva, 2005.
3. Chandra S. Status report on Indian medicine and folk healing. Report submitted to Govt. of India. 2011
4. Valiathan MS. Introduction to Ayurveda, Oriental Black Swan, India, 2013
5. Valiathan MS. Ayurvedic Inheritance of India, NPTEL Online Lecture Series, IIT Madras, 2013.
6. WHO Traditional Medicine Strategy: 2014-2023, World Health Organization, Geneva, 2014.

SHS208 Ageing & Society: 2 credits

Course Objectives:

1. To provide an overview of demographic, social, psychological and health issues related to population ageing
2. To expose students to the health status of older adults, disease and disability burden and challenges to public health due to population ageing

Course outline:

1. 1.Demographic trends and epidemiological description of the major health problems and issues for older populations and their implications for public health
2. Theories of ageing and biology of ageing: Identify the components of usual versus successful aging, behavioural, social and environmental factors that influence successful ageing
3. Chronic conditions and Disability in older adults: their implications for public health, functional decline, Fall prevention
4. Nutrition of older adults: frailty, obesity in older adults
5. Health care services for older adults: strategies to prevent diseases and promote health in elderly
6. Dementia, Alzheimers and other mental health conditions in older adults: its implications for families and society, Alzheimer's Disease and Caregiving
7. Socio-cultural change and social care needs of older adults: Historical shifts in position, family care giving, current social care giving needs of ageing adults
8. End of life care
9. Policy and programmes for welfare of older adults: Policies and programs from India and around the world that support healthy ageing will be examined.

Suggested reading:

1. Prohaska,T.R. Lynda A. Anderson, Robert H. Binstock(eds) 2012. Public Health for an Aging Society. USA: JHU Press. ISBN: 9781421404356
2. Whitbourne S.K. 2001. Adult development and ageing. Biopsychosocial perspectives John Wiley & sons.
3. Hofer S.M. Duane F Alwin. Ian Stuart Hamilton. 2011. An introduction to gerontology. UK: Cambridge University Press.
4. Scott M. 2008. Handbook of cognitive ageing. Interdisciplinary perspectives. USA: Sage publications
5. Albert S.M.2014. Public Health and Aging: An Introduction to Maximizing Function and Well-being. USA: Springer publication
6. Schweda,M. Larissa Pfaller, Kai Brauer, Frank Adloff, Silke Schocktanz. 2017. Planning later life: bioethics and public health in ageing societies: Routledge
7. National Research Council (US) Panel on Race, Ethnicity, and Health in Later Life; Anderson NB, Bulatao RA, Cohen B, editors. Critical Perspectives on Racial and Ethnic Differences in Health in Late Life. Washington (DC): National Academies Press (US); 2004. 17, Behavioral Health Interventions: What Works and Why? Available from: https://www.ncbi.nlm.nih.gov/books/NBK25527/

SHS209 Global Health Case studies: 1 credit

Course objectives:

- To learn about health systems and services in high, medium, low income settings

Course outline:

Students will select any topic in the field of maternal and child health, infectious diseases, non-communicable diseases, injuries, mental health and prepare a dissertation on the health systems and health interventions in a different country and present an analysis of the similarities and differences with the existing situation in India

Suggested reading:

As per the discussion between student and mentor

Semester III

Semester III		
Core Courses		
Subject Code	**Subject Title**	**Number of Credits**
SHS301	Non-communicable Diseases, Injuries and control programmes	4
SHS302	Human Genetics	4
SHS303	Maternal and Child Health	4
SHS304	Laboratory methods in Health Sciences II	4
Elective Courses		
Subject Code	**Subject Title**	**Number of Credits**
SHS305	Basics of Pharmacology	2
SHS 306	Internship	2
SHS307	Nutrition Research Methods and Techniques	4
SHS308	Disaster Management and Outbreak Investigation	1

Explanatory note on semester III

The courses offered in this semester provide in depth understanding of dual burden of diseases in India. The courses discuss non communicable disease, morbidities and mortality during maternity and child hood. These courses are supported by laboratory based courses where students are imparted skills of using various diagnostics techniques.

SHS 301 Non-communicable Diseases, Injuries and Control Programmes: 4 Credits

Course Objectives:

- To give an understanding of the pathophysiology of major NCDs. Classification, clinical manifestations, diagnosis and, treatment.
- To understand the risk factors for common NCDs, and methods of disease control and health promotion
- To give an understanding of the pathophysiology of some common mental health problems

Course outline:

1. Epidemiology of NCDs, risk factors, global status, prevention and control, global initiatives
2. National strategies for control of NCDs (epidemiology, pathophysiology including biochemical and genetic parameters, cardinal signs, clinical and diagnostic features (with special emphasis on biochemical parameters), treatment (emphasize pharmacological component) prevention and control
   a. Diabetes
   b. Cardiovascular diseases
   c. Asthma and COPD
   d. Cancer
   e. Musculo-skeletal conditions
3. Tobacco, obesity and other risk factors for NCDs
4. Unintentional Injuries- prevention and control; global and national strategies
5. Introduction to mental health, health promotion, National Mental health policy of India
6. Epidemiology of Major Mental Disorders burden of mental health morbidities, psycho-social, etiology of mental and behavioural disorders; depression, schizophrenia, Alzheimer's, Parkinson's, senile dementia, suicides

Suggested reading:

1) Class handouts
2) World Health Organization (2016). Global Report on Diabetes. WHO Press, Switzerland
3) National Centre for Disease Control Director General of Health Services Ministry of Health and Family Welfare, GOI 2017. Training Module for Medical Officers for Prevention, Control and Population Level Screening of Hypertension, Diabetes and Common Cancer (Oral, Breast and Cervical). National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke
4) World Health Organization 2014: GLOBAL STATUS REPORT on Non-Communicable Diseases
5) World Health Organization 2013: Global Action Plan for the Prevention and Control of Non-Communicable Diseases, 2013-2020, WHO, Geneva, Switzerland
6) Standard Treatment Guidelines: Hypertension Screening, Diagnosis, Assessment, and Management of Primary Hypertension in Adults in India- Quick Reference Guide May 2016 Ministry of Health and Family Welfare, Government of India
7) Prevention of cardiovascular disease: guidelines for assessment and management of total cardiovascular risk: World Health Organization. ISBN 978 92 4 154717 8 (NLM classification: WG 120) © World Health Organization 2007

SHS302 Human Genetics: 4 credits

Course Objectives:

- To present the fundamentals of human genetics with specific reference to health and disease
- To introduce students to the methods in studying human inheritance
- To provide overview of the mechanism of disease

Course outline: Unit I Basic genetics

1. Genetics in health and disease, introduction to the concept of classical and molecular genetics, history of genetics, Applications of recombinant DNA technology
2. Molecular basis of heredity: DNA as the genetic material, structure and replication with special emphasis on how continuity of the genetic information is maintained, mutation, mutagens and teratogens, birth defects and congenital abnormalities, DNA repair, repair defects and cancers, recombination and genetic diversity, establishing diversity of cell functions----transcription and translation.

Unit II: The human genome, genes and disease:

1. Organization of the human genome, number, functional diversity, structural diversity, gene expression, epigenetic mechanisms, multigene families, repetitive DNA
2. Genetic basis of human disease: chromosomal abnormalities, prevalence, presentation, chromosome structure, analysis and classification of abnormalities
3. Single gene alterations: patterns of inheritance, molecular pathology
4. Molecular pathology
5. Diseases with a genetic predisposition
6. Genetic testing and ethical issues

Suggested reading:

1. Molecular Biology of Cell, Alberts et al, Garland; 3 edition 1994
2. Molecular Cell Biology, Lodish et al, W. H. Freeman; 5 edition, 2003
3. Concepts of Genetics, Klug and Cummins, 7th edition, Prentice Hall, 2002
4. Human Molecular Genetics, Strachen and Read, 2nd edition, BIOS Scientific Publishers, 1999
5. Genes VII, Lewin et al, Oxford University Press, USA 1999
6. Medical genetics, Prichard and Kroff, 3rd edition, Mosby; 2005
7. Reviews and papers, Pubmed

SHS303 Maternal and Child Health : 4 credits

Course objectives

- To introduce students to the essential components of maternal and child health and health care programme
- To discuss global and national maternal and child morbidity and mortality trends its important interventions to responsible for the change in trends

Course outline

Unit 1 Women's maternal Health

1. Burden of reproductive ill-health: unintended pregnancies, unsafe abortions, MTP act, sexually transmitted infections, infertility,
2. Evolution of the concept of reproductive health and its implications
3. Early human development and public health implications, Gametogenesis, fertilization, implantation, Fetal development, Preconception period, maternal and paternal risk factors for maternal and fetal outcomes, Developmental origins of adult diseases
4. Antepartum – antenatal care and significance, physiological changes during pregnancy, complications of pregnancy, high risk pregnancy
   Intrapartum- stages of labour and delivery, components of labour, danger sign and management of labour complications of labour and delivery
   Postpartum – care, complications of postpartum
5. Maternal morbidity and mortality; levels and causes of maternal mortality
6. Contraception, sterilization, population control

Unit 2 Child Health

1. Levels and trends in child mortality, major causes of neonatal, infant and child mortality and public health interventions
2. Major causes of neonatal mortality; Preterm births, low birth weight and public health interventions; birth defects
3. Common morbidities among young children; lower respiratory tract infections, diarrhoea,
4. Immunization; coverage, factors
5. Infancy and child hood: Growth and development; physical, motor, cognitive, psycho-social and language development
6. Child nutrition
7. Policy and programmes: the main national and international interventions for prevention of reproductive and childhood/adolescent morbidity and mortality, including RMNCHA+, JSSK, RBSK, IYCF, IMNCI, maternity benefit schemes

Suggested reading:

1) Kotch Jonathan B. Maternal and Child Health: Programs, Problems, and Policy in Public Health 3rd Edition Jones & Bartlett Learning; 3 editions (May 11, 2012) ISBN-13: 978-1449611590
2) Ehiri John(Ed.) Maternal and child health: Global challenges, programes and policies. Springer-Verlag US 2009
3) Dutta D C. Textbook of Obstetrics: Including Perinatology and Contraception. Jaypee Brothers Medical Publisher Ltd. New Delhi. 8th Edition 2016
4) Dutta D C Textbook of Gynaecology. JAYPEE BROTHERS MEDICAL PUBLISHERS (P) LTD New Delhi 6th edition 2013

5) Behrman RE and Kliegman R. Nelson's textbook of paediatrics. Elsevier Inc Publication 2016 ISBN: 978-1-4557-7566-8
6) Ghai O P. Essentials of Paediatrics. CBS Publications and Distributions Pvt Ltd. New Delhi 8th Edition 2013

SHS 304 Laboratory Methods in Health Sciences II:4 credits

Course objectives: To equip Health sciences students with molecular biology skills useful for biomedical research

Course outline:

1. DNA Isolation, quantification, gel electrophoresis,
2. Polymerase Chain Reaction
3. RNA isolation, quantification, gel electrophoresis
4. cDNA preparation and Real-Time PCR
5. Restriction Digestion of DNA
6. SDS PAGE and western blotting

Reference

Michael R. Green & Joseph Sambrook (2012). Molecular Cloning:A laboratory manual.Fourth edition, Cold Spring Harbor Laboratory Press

ELECTIVES

SHS305: Basics of Pharmacology: 2 Credits

Course objective:
To provide health sciences students with basic understanding of pharmacology and drug discovery and development process

Course Outline

1. Introduction to pharmacological sciences, branches: Pharmacology, Pharmacognosy, Pharmaceutical Chemistry, Toxicology, Pharmaceutics
2. Definition and concepts of drugs, routes of drug Administration
3. Sources and classification of drugs: Synthetic, semi-synthetic and natural products including plant, animals, microbes and fungi with special reference to marine organisms. Pharmacological classifications and chemical classification
4. Introduction to Pharmacokinetics, Pharmacodynamics Adverse Drug Effects, Adverse Drug Events, Definitions of Drug, disease, leads, receptors, targets, pharmacophore, new chemical entity (NCE), new molecular entity (NME), new drug application (NDA), abbreviated new drug application (ANDA) etc.
5. Drug discovery and Development process: R&D, Rational Drug Discovery Approach Preclinical studies, Clinical studies (Phase I, II III and IV), Pharmacovigilance, Haemo-vigilance, Pharmacoepidemiology, Bioavailability and Bioequivalence (BABE)
6. Introduction to Regulatory guidelines: FDA, CPCSEA, Pharmacopoeias (IP, API, etc.).

References:

1. Bhushan Patwardhan and Rathnam Chaguturu.Innovative Approaches in Drug Discovery, 1st Edition 2016. Academic Press. ISBN: 978-0-12-801814-9. http://store.elsevier.com/Innovative-
2. Approaches-in-Drug-Discovery/Bhushan-Patwardhan/isbn-9780128018149/
3. Bramhankar D. M, Jaiswal S. B, Biopharmaceutics and pharmacokinetics: A Treatise, 3rd edition,Vallabh Prakashan.
4. Tripathi K.D.: Essentials of Medical Pharmacology, 7th edition, Jaypee Brothers, Medical Publishers, New Delhi.
5. Rang H.P. and Dale M.M.: Pharmacology, 9th edition Churchill Livingstone, Edinbergh
6. Remington: The Science and Practice of Pharmacy, Volumes 1-2, 22nd edition, 2012, Edited by Allen L V, Adeboye A, Shane P D, Linda A F, Jointly published by Pharmaceutical Press and Philadelphia College of Pharmacy at University of the
7. Kokate C. K., Gokhale S.B. and Purohit A.P., Textbook of Pharmacognosy, Nirali Prakashan, Pune, 2008, ISBN: 8185790094.
8. Kuchekar B.S., Forensic pharmacy, 9th edition. Nirali Prakashan.

SHS 06 Internship: 2 credits

Course objective:
To provide an understanding of day to day activities and functions of professionals working in the public health system

Course outline

Six-weeks internship at a public health facility, or with a disease control programme. Assessment through activity diary, journal and report submission and presentation. Report may be submitted in Semester III. This course is usually timed during the period between Sem II and III.

SHS307 Nutrition Research Methods and Techniques: 4 credits

Course objectives:

- To orient students to the research methods in the field of public health nutrition.
- To develop their skills in nutrition research methods and to update them with the current techniques in nutrition research.

Course outline:

1. Principles of nutritional epidemiology
2. Nutritional Survey, Surveillance, Monitoring and Evaluation
3. Tools and Techniques: Anthropometry
    a. Height and weight measurements
    b. BMI, Z score, WHO software's: Anthro, Anthroplus
    c. Circumference measurements- MUAC cut offs: SAM, MAM , Old classisification in comparision with new. Other circumferential measurements
    d. Skinfold measurement
    e. Comparison to standards
    f. Technical error of measurement
    g. Growth charts- growth monitoring, Types of charts, target height, percentiles, deriving third percentile.
4. Dietary and Nutrient intake analysis – Energy expenditure, energy balance, Diet recall, Food frequency, Weighment method, comparison with standards; Units of measurement in foods, Standardisation of foods for portion sizes, Nutritional questionnaires
5. Nutritional screens - Physical examinations for clinical signs and symptoms, Biochemical assessment methods, cut offs.
6. Standards for comparison – RDA, NCHS standards, ICMR standards

Suggested reading:

1) Willett, W. (2012). Nutritional epidemiology. Oxford University Press.
2) Margetts, B. M., & Nelson, M. (Eds.). (1997). Design concepts in nutritional epidemiology. OUP Oxford.
3) Frisancho, A. R. (1990). Anthropometric standards for the assessment of growth and nutritional status. University of Michigan Press.
4) Cohen, B. E. (2002). Community food security assessment toolkit (pp. 02-013). Washington, DC: US Department of Agriculture, Economic Research Service.
5) Billig, P., Bendahmane, D., & Swindale, A. (1999). Water and sanitation indicators measurement guide. Food and Nutrition Technical Assistance Project, Academy for Educational Development.
6) World Health Organization. (1995). The use and interpretation of anthropometry: report of a WHO expert committee. World Health Organ Tech Rep Ser., 854, 312-409.

SHS308: Disaster Management and Outbreak Investigation: 1 Credit

Course objectives

To introduce students to the climate change and its implications on Public Health and orient them towards outbreak investigation and introduce natural and man-made disasters and mitigation principles

Course outline

Unit 1 Public Health in Outbreaks

1. Disease outbreaks in India
2. Outbreak investigation
3. Epidemic control in India; integrated disease surveillance, legislation for the control of outbreak in India, international health regulations

Unit 2 Disaster management

4. Introduction to Natural & Man-made Disasters
5. Disaster Preparedness: Disaster Preparedness Plan, Disaster Preparedness for People and Infrastructure, Role of technology in disaster Preparedness
6. Disaster management: Hazard, Risk and Vulnerability, Concept and Relationship, disaster Risk Reduction, risk Analysis Techniques, People Participation in Risk Assessment
7. Disaster Mitigation: Disaster Mitigation Strategies, Emerging Trends in Disaster Mitigation, Role of Team and Coordination,
8. Rehabilitation, Reconstruction & Recovery
9. Disaster Response: role and responsibilities of different governmental organizations at local, district, state and central level

Suggested reading:

1. Taori, K (2005) Disaster Management through Panchayati Raj, Concept Publishing Company, New Delhi.
2. Roy, P.S. (2000): Space Technology for Disaster management: A Remote Sensing & GIS Perspective, Indian Institute of Remote Sensing (NRSA) Dehradun.
3. Sharma, R.K. & Sharma, G. (2005) (ed) Natural Disaster, APH Publishing Corporation, New Delhi.

Semester IV

Semester IV		
Core Courses		
Subject Code	**Subject Title**	**Number of Credits**
SHS401	Clinical and Field Trials	2
SHS402	Bioethics, Biosafety and regulations	2
SHS403	Research Project I	4
SHS404	Research Project II	4
SHS405	Human molecular and cellular biology	4
Elective Courses		
Subject Code	**Subject Title**	**Number of Credits**
SHS406	Disability and Public Health	2
SHS407	Critical reading	2
SHS408	Proposal Development	2
SHS 409	Monitoring and Evaluation of Public Health Programmes	1

SHS401 Clinical and Field Trials :2 credits

Course Objectives:

The course aims to furnish the students with the following knowledge and skills:

1) Understand the general principles of clinical trials research
2) Have a theoretical idea about the design conduct and analysis of clinical Trials

Course outline: Clinical trials and Field trials:

1. Introduction to Clinical research: clinical research designs, clinical trial, conduct and regulation
2. History of the development of the clinical trials research process
3. Introduction to the phases of clinical trials research
4. Designing trials
5. Trial size
6. Field organization and ensuring data of high quality
7. Trial design
8. Community engagement
9. Determining sample size
10. Single and multicentre trials
11. Techniques for randomization
12. Data collection management and endpoints
13. Recruitment and retention of trial participants
14. Standard Operating Procedures (SOP's)
15. Adverse events and serious adverse events (SAE's)
16. Interim monitoring
17. Introduction to field trials of health interventions
18. Phase IV studies
19. Budgeting human resource and materials
20. Quality control

Suggested reading:

1. Clinical Trials: A Practical Guide to Design, Analysis, and Reporting by Duolao Wang and Ameet Bakhai (Remedica, 2006)
2. Textbook of Clinical Trials edited by David Machin, Simon Day and Sylvan Green (Wiley, 2004)
3. Field Trials of Health Interventions: A Toolbox by Peter G. Smith, Richard H. Morrow, David A. Ross (OUP, 2015)
4. Randomization in Clinical Trials: Theory and Practice (2nd ed.) by William F. Rosenberger and John M. Lachin (Wiley, 2016)
5. An Insider's Guide to Clinical Trials by Curtis L. Meinert (OUP, 2011).
6. CONSORT Checklist-CONSORT statement. 2010. Available on www.consortstatement.org/media/default/downloads/consort2010
7. The University of Illinois at Chicago. Evidence Based Medicine: PICO. Available on http://researchguides.uic.edu.

SHS 402 Bioethics, Biosafety and Regulations: 2 credits

Course objectives:

- To introduce students to the ethical principles and practices in public health research
- To introduce students to the existing guidelines

Course outline:

1. Introduction to Bioethics – principles and history
2. Clinical research: clinical research designs, clinical trial, conduct and regulation
3. National Ethical Guidelines for biomedical and health research
4. Regulations for medical devices, drug and biological material regulations
5. Publication ethics and regulations – introduction; fabrication, falsification, or plagiarism; ethics in scientific publications, guidelines and best practices of publications, committee of publication ethics
6. Guidelines for biosafety, animal ethics, stem cell guidelines, data sharing policies

Suggested reading:

1) National Ethical Guidelines for biomedical and health research involving human participants. ICMR, 2017
2) Guidelines and e-learning tools of Committee of Publication Ethics
3) CDSCO, 2013. Regulations and Guidelines Specific to Ethics Schedule Y & CDSCO-GCP., Available on www.cdsaindia.in/sites/default/files/02_Regulations_Dr.Bangaruranjan.pdf
4) CONSORT Checklist-CONSORT statement. 2010. Available on www.consortstatement. org/media/default/downloads/consort2010
5) The University of Illinois at Chicago. Evidence Based Medicine: PICO. Available on http://researchguides.uic.edu.

SHS 403 & SHS 404 Research project I and II :4+4 credits

Course objectives and outline:

The purpose of research project is to encourage students to undertake independent research and to foster research-related skills, which should benefit future study and employment.

Each candidate for the Masters of Public Health (MPH) is required to undertake a research project in Semester III and completes it by end of Sem IV. The research project must exhibit original investigation, analysis and interpretation. The research project is to be done with research supervisor.

Initiate research and formulate feasible research questions

Design, develop tools and conduct original research

Synthesize literature and conduct analyses

Present research findings and argument in a suitably structured and sequenced manner

SHS 405 Human Molecular and Cellular Biology: 4 credits

Course objectives:

To provide basic understanding of human molecular and cellular biology in health and disease.

Course outline:

1. Structure and diversity of human cells, Intracellular organization. Cell cycle- Different phases of cell cycle, Controls and Check points, cyclins and cdks – types and their role. Cell proliferation, senescence and programmed cell death (Importance in different life stages)
2. Cell Signaling and Signal Transduction: Important classes of cell signalling molecules in humans (Hormones, growth factors, cytokines), cell adhesion, extracellular matrix, receptors-intracellular, cell surface receptors, endocrine, paracrine and autocrine signalling Second messengers.
3. Introduction to rDNA technologies, Next Gen Sequencing and its applications
4. Stem cells and differentiation: Role in early human development and renewal of mature tissues
5. Pharmacogenetics, Personalized Medicine, and Population Screening
6. Epigenetics: Mechanisms and role in human health

Suggested reading:

1. Tom Strachan and Andrew Read. Human Molecular Genetics, 4th Edition, Garland Science.
2. Geoffrey M Cooper and Robert E. Hausman. The Cell: A Molecular Approach. 4th Edition, ASM Press.

Elective

SHS 406 Disability and Public Health: 2 Credits

Course objectives

- To introduce students to disability as a public health issue
- To identify needs of the disabled and find ways to address the issues that the disabled face in developing countries

Course outline:

1. Defining disability: evolving concept of disability, medical model, social model and human rights perspective of disability
2. 2.Disability and public health: issues of definition and ethics
3. Data sources and estimating disability: global and national level data sources, trends in developed and developing countries, epidemiological data on disability
4. 3.Determinants of disability: preventable disability, developing preventative strategies for avoidable disabling conditions,
5. 4.Health and social care needs of disabled: health care needs of disabled, accessibility, availability and affordability of health services for disabled, approach to comprehensive, integrated care for disabled, role of public health
6. 5.social and psychological experience of disability, stigma and discrimination faced by affected individuals, identification of care needs, role of psycho-social support, approach to comprehensive, integrated care for disabled
7. 6.Public health implications of disability: overview of policy, programmes, innovation, interventions, rehabilitation, reablement

Suggested reading:

1) Drum C.E. Krahn G.L., Hank Bersani Jr. Disability and Public Health. Washington, USA: American Public Health Association. Washington USA. 2016 Print ISSN: 0090-0036 | Electronic ISSN: 1541-0048
2) Lollar D.J, Anderson, ElenaM (eds) Public Health Perspectives on Disability: Epidemiology to Ethics and Beyond. USA: Springer Publication, 2011. ISBN 978-1-4419-73412
3) Berghs M, Atkin K, Graham H, Hatton C, Thomas C. Implications for public health research of models and theories of disability: a scoping study and evidence synthesis. Published by Public Health Res div of National Institute for Health research. 2016.
4) Beyrer C, and Pizer HF, (eds). Public health and human rights; evidence-based approaches. Baltimore, MD: The Johns Hopkins University Press, 2007.
5) Jean O'Hara Jane McCarthy Nick Bouras. Intellectual Disability and Ill Health - A Review of the Evidence .Cambridge University Press India Pvt Ltd, 2010. ISBN: 9780521728898, 0521728894

SHS407 Critical Reading: 2 credits

Course objective

- To introduce students to critical reading, analysis and interpretation of academic articles

Course outline:

The course will focus on capacity building to improve reading, understanding, analysis and interpretation of academic article. Students will be given a research article and mentored to understand the research gap, research questions, objectives, methods and results and understand how to identify the novel contributions of the research, how they contribute to existing knowledge and limitations of the study

SHS408 Proposal Development: 2 credits

Course objectives:

To impart training in the methodology of developing a research proposal and scientific writing

Course outline:

Students will write a research grant or fellowship application including ethical guidelines and other regulatory requirements. Students are expected to select a topic, conduct a literature review, identify a research gap, frame research questions, develop objectives, study hypothesis, select a study design, write the detailed methodology, develop the analysis format including statistical tests to be applied

SHS409: Monitoring and Evaluation of Public Health Programmes: 1 Credit

Course objective

- To expose students to the methods of monitoring and evaluation in the broader framework of health and nutrition programmes.
- To build students capacity to develop framework for monitoring and evaluation independently

Course outline:

1. Introduction to monitoring and evaluation: difference between monitoring and evaluation
2. Programme Logic models and Theory of change
3. Deciding on key aspects of the program to monitor, identifying data sources, designing sound data collection and collation tools
4. Evaluation principles and approaches for field-based programs, identifying evaluation questions and developing a learning agenda, selecting an appropriate evaluation design, Collecting evaluation data
5. Developing Objectives and indicators for M&E : quantitative and qualitative indicators
6. Evaluation: types, evaluation question,
7. Identifying program stakeholders and their information needs
8. Selecting appropriate communication tools for different audiences

Suggested reading:

Class handouts