

REVISED SYLLABI
submitted for Peer Review

1. Master of Public Health (MPH)
2. Master of Science Health Sciences (M.Sc H.Sc)
3. Master of Science Nutritional Sciences (M.Sc.NSc)
4. Master of Science Health Sciences(Dietetics)
(M.Sc H.Sc (Dietetics))



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“.....a nation's wealth prosperity and achievement and advancement, whether in the economic or the intellectual sphere, are conditioned by the state of its physical well being”

Health Survey and Development Committee, 1948

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Background Note

The post-graduate public health teaching programmes of the University of Pune, Interdisciplinary School of Health Sciences

The Interdisciplinary School of Health Sciences is one of the forty-four departments of the University of Pune. It is one of the pioneering public health teaching programmes in the country. The School conducts three innovative courses, Master of Public Health (MPH), M.Sc. Health Sciences, (a public health biology course) and M.Sc. Health Sciences (Dietetics) course, to be revised into a public health nutrition course, M.Sc. Nutrition Sciences.

Unlike traditional public health programmes, the courses of the University of Pune's Interdisciplinary School of Health Sciences address not only the current health challenges confronting the country but also look prospectively at issues and skills that will be required in the near future. This overview describes the genesis and evolution of the public health teaching programmes of the School, the evolution of the courses leading to the current structure of its public health teaching programmes and a note on the Nutrition Sciences course.

Introduction

- In 1989, the University Grants Commission (UGC) under the Chairmanship of Dr Manmohan Singh awarded a seed grant to the University of Pune to initiate interdisciplinary teaching in the field of health¹. ~~The curriculum, named Health Sciences, evolved over the years, the School pursued the Health Sciences teaching programme, accruing during this period process,~~ expertise in teaching public health to students from the life, social and clinical sciences, core faculty, ~~and a~~ a panel of expert visiting faculty, academic programme advisors of national and international repute, infrastructure and teaching methods.
- In 2005, the School obtained a second grant from the UGC under its Innovative Programme scheme, to initiate a post graduate teaching programme leading to a Master of Public Health degree.

¹ The roots of the academic programme of this School go back to the 1980's, during the Health for All movement. Under the leadership of Late Prof P V Sukhatme, (Padmabhushan) an interdisciplinary group of experts from the fields of public health, medical anthropology, economics, statistics, social sciences and life sciences evolved concepts over a series of Winter Schools. These ideas were structured and developed into a two-year, full-time post-graduate programme in Biometry, Health and Nutrition. This course was renamed Health Sciences in 1994. From its initiation, the courses at the School have kept a strong focus on understanding the role of the determinants of health in influencing health outcomes.

- This makes the University of Pune the first University in the country to initiate teaching of MPH with UGC support.
- In 2000, noticing that there was no post-graduate teaching programme in Dietetics, the School launched a Masters programme in Dietetics. This programme has been maintained as a self-supporting programme, not supported by any agency.

2.0 Rationale behind the development of the academic programmes:

The development of the post-graduate programmes were based on the following rationalizations:

- a. Public health is the art and science of preventing disease and promoting health. It is an interdisciplinary science that is distinct from medicine. Public health involves promotion of health and prevention and control of disease in healthy populations, whilst medicine is the art of treating the diseased.
- b. The academic programmes should address the existing challenges in the field of public health in India.
- c. The teaching programmes should keep in mind international developments in the field of public health and public health education.
- d. The teaching programmes should take into consideration the original UGC concept of evolving interdisciplinary study programmes by using the existing knowledge and skills of the vertical disciplines of the University

3.0 Goals of the academic programmes :

Keeping in mind this rationale, the goals of the courses of the School are three-fold.

- Firstly, understanding the acute shortage of public health manpower in the country, the academic programmes of the School aim at creating human resource with an understanding of the principles of prevention and health promotion and skills to bring about changes in the health status of the population, especially the poor, vulnerable and unreached strata of society.
- The second goal of the School is to play a pioneer role as a knowledge institution in the field of public health, through innovations, research, monitoring, evaluation and contributing to public health policy through peer reviewed research data and research publications.
- Finally, with its decade long experience of teaching an innovative programme in public health, the third goal of the School is to evolve public health as a discipline in Indian Universities. In keeping with this role, the School aims at assuming a pioneer role in the evolution of need-based post-graduate public health curricula, which would address the current as well as future needs in the field of public health in India.

3.0 Structure of the academic programme and its rationale :

3.1 Structure :

The School has three post-graduate courses.

- Master of Public Health (MPH)
- M. Sc. Health Sciences which is a course on public health biology
- M. Sc. Health Sciences (Dietetics) which is a course on public health nutrition

These three programmes share common courses in public health and epidemiology, followed by the specialized field of study. In this way, the public health approach permeates throughout the teaching programmes, irrespective of the specialization that the student selects.

3.2 Master of Public Health :

The goal of the MPH programme is to

- develop human resource with expertise in the field of public health and epidemiology, with specific skills in public health management and administration, research, teaching and leadership skills.
- The purpose of this programme is to address the enormous man-power crisis in this field in the country.
- The MPH programme also aims at the creation of public health researchers, professionals, who would be able to identify researchable areas, design and conduct studies, and ultimately contribute towards the development of public health policy in the country.
- The new syllabus includes two new specializations, one in Maternal and Child Health (MCH) and the other in Community Nutrition (CN).
- Community nutritionists trained in this programme would have the knowledge and skills of diagnosis of nutritional status of individuals and populations through nutritional assessment methods, have the ability to design strategies to enhance community health through implementation of nutrition intervention programs and possess research skills to investigate and critically analyse nutrition problems through community diagnosis; as well as plan, manage, participate in, and evaluate community nutrition programmes.
- Students with MCH specialization will have the appropriate skills to tackle the existing problems related to maternal and child health.

The first batch of MPH students will graduate in May, 2008.

3.3 Master of Health Sciences :

The Health Sciences course focuses exclusively on the field of public health biology.

- Traditionally, the role of public health laboratories have been to provide support in the prevention and control of disease through surveillance, through the confirmation of etiology during outbreak investigation, and in environmental health surveillance.
- In contrast with this role of the laboratory in public health, the Health Sciences course focuses on population studies through incorporating both epidemiologic and laboratory skills. This course aims at creating a new cadre of public health professionals, namely infectious disease epidemiologists, molecular epidemiologists and genetic epidemiologists. There is currently no formal post-graduate course in the country to train students with these skills.
- The course teaches the basic course in public health and epidemiology, followed by laboratory knowledge and skills from the fields of microbiology, biochemistry, immunology and genetics as applied to health and disease, and their applications in epidemiologic activities (disease surveillance, outbreak investigations, identifying transmission patterns, risk factors and biomarkers, early detection of pathogens etc).
- The course describes genome technology that has moved from the laboratory to the healthcare settings, including public health applications in the developed world.
- The course includes a strong grounding in the ethical, legal, regulatory and social aspects of new health technologies entering the private and public health sectors of the country.

Batches of students have graduated from this programme from 1994. These students are either in academic research in this country or abroad, employed in national and international non-governmental organizations, or are placed internationally as public health programme managers. 16 classes of average size of 187 have graduated from this course. The course has had a large number of international students from South East Asia (Nepal, Bangladesh, Sri Lanka, Mauritius) and the Middle East (Yemen, Iran) and Africa (Ethiopia).

3.4 Master of Health Sciences(Dietetics) :

Health Sciences conducts a Masters degree in Dietetics. The course aims at facilitating the understanding of the preventive, promotive and curative role of diet in health care; enabling the students to make appropriate dietary modification for various therapeutic conditions based on the pathophysiology of the disease and imparting knowledge and skills for effective diet counseling. The curriculum comprises of theory as well as practical training including internship at hospital dietetics departments. Theory includes

various courses on the nutritional requirements and dietary modifications during the life cycle and various disease conditions. Nutritional requirements for physical training and those of sportsmen are also taken into account.

Students from the Dietetics course are employed as dietitians in all leading hospitals in Pune and some at Mumbai, and are working as research assistants/ as PhD students in various ongoing research projects.

3.4 M.Sc Nutritional Sciences programme :

The M.Sc. Nutritional Sciences programme arises from a revision of the M.Sc. Dietetics programme of the School. From 2000, six batches of students have completed their studies and are employed as dietitians in all leading hospitals in Pune and some at Mumbai, and are working as research assistants/as Ph.D. students in various ongoing research projects. The Dietetics programme may not be offered in case the Nutritional Sciences programme is initiated.

The MSc Nutrition Sciences programme will be initiated from 2008, subject to funding from the Department of Biotechnology. In case of this funding, the course will be offered as an Integrated MSc-PhD programme.

- The goal of this programme will be to generate human resources
 - With an understanding of the type and extent of nutritional problems of public health importance in the country
 - The role of dietary modifications as one of the major interventions for improving community health
- With this contextual background, the specific knowledge and skills to be provided will include a strong understanding of the physiological and biochemical basis of metabolism, and gene-nutrient interactions, supplemented by appropriate laboratory skills.
- The Nutritional Sciences programme will specifically focus in three areas, viz., maternal-fetal interactions, diabetes and cardio-vascular diseases.

4.0 Conclusion:

Internationally, academic programmes in public health have witnessed additions to the core courses. New teaching areas have evolved, whilst retaining the core disciplines that provide expertise to deal with existing public health problems. The endeavour of the University of Pune's public health teaching programme has been to develop a multifaceted public health teaching programme that addresses the current challenges

facing the public health system of the country, while at the same time creating human resource who can tackle future needs of the country. Thus, the MPH retains a traditional programme of key public health disciplines, whilst Health Sciences and Nutrition Sciences provide additional specialized skills in laboratory sciences and nutrition sciences. The courses have a wide scope, traversing the spectrum from community to laboratory skills. It is hoped that with this teaching programme, the University of Pune will be able to contribute to public health in India, especially the health needs and requirements of the poor and vulnerable strata of the society.

Master of Public Health
(MPH)



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Background

The foundations of the Indian public health system were laid down sixty years ago in a newly independent country. Over the years, this system has grown, accumulating a mixed record of successes. The burden of malnutrition has reduced and there have been a number of notable achievements in infectious disease control and eradication. These achievements are reflected in the progressive improvements in the health indicators of the country, and in the decline in the reported cases of many infectious diseases that once contributed significantly to the infectious disease burden. Socio-economic development have introduced new problems associated with increased longevity and altered lifestyles. Epidemiologic transition as well as newly emerging infections has started looming in the horizon, even as many unfinished tasks continue to challenge the system. Compounding this situation, health development in India continues to be influenced by a spectrum of other factors that range from resources, policy issues to issues regarding lack of valid data to base policies and interventions.

The purpose of the Master of Public Health (MPH) programme is to train human resources in the science of public health, with a firm understanding of the determinants of health and the public health system in the country, the community context, the determinative influences of globalization, urbanization, global and national policies and a strong foundation in research methodology. The MPH was launched in 2005 and is supported by the University Grants Commission (UGC) under its Innovative Programme scheme (sanction no.F.14-62/(Inno./ASIST). The Interdisciplinary School of Health Sciences is the first institution to receive UGC support, which implies that public health teaching can now be open for students from life, social and clinical sciences.

Goal of the MPH programme

- To develop human resource with expertise in the field of public health and epidemiology, who can ensure comprehensive health development of the community and better quality of life;
- To create good advocates for launching public health movements;
- To promote the understanding of the need to integrate social and cultural factors and determinants into the practice of public health;
- to develop qualities that encourage the development of innovative and alternative approaches to meet the varying local needs of communities;
- To train students in health services/systems research in order to encourage this as an integral part of health administration/management.

Objectives of the MPH programme

- 1.To prepare **public health practitioners** having the :
 - knowledge and skills of community diagnosis

- ability to design strategies to enhance community health
- skills to implement intervention programs
- skills to develop public health policy
- knowledge to evaluate the impact of public health policies on community health
- leadership skills in public health administration

2. To evolve public health as a discipline in Indian Universities, with these departments having the objective of training **public health researchers** who will produce data for planning public health policies

Skills and Competencies to be imparted

- a) public health management
- b) public health research
- c) teaching skills
- d) leadership skills

Eligibility

The course will be open to students with an undergraduate degree in biological, clinical and social sciences including B.Sc. (life sciences, nursing, pharmacology, dietetics), B.A. (Anthropology, Sociology, Psychology, LL.B, Journalism), MBBS, BAMS, BHMS, BUMS, BDS, MSW or students from any other discipline with evidence of work in the field of public health

Number of seats : 10

Fees : As per rules of University of Pune

Credits and Specializations

MPH is offered as a two-year full time course. The two-year course is organized into four teaching Semesters. Each Semester consists of 15 weeks of teaching. One credit hour is equivalent to 15 hours of teaching

Students need to complete 100 credits in order to obtain the Masters degree. The School is planning to offer two specializations. For the MPH (General) students are strongly encouraged to take all 100 credits from the courses being offered at the School. For Maternal and Child Health (MCH) and Community Nutrition (CN) specializations, 75 credits from the general MPH are compulsory. Specialization will involve 25 specialized credits, including 10 credits of dissertation on a topic in the field of specialization.

Teaching and evaluation

There is one hour of assessment for every 4 hours of teaching. Assessment may be in the form of evaluation of long/short written answers, multiple choice questions, presentation, term papers, assignments etc. 50% of assessment is done during term so that there is continuous evaluation of the student, 60% assessment is done at the term end examination (held around May and November respectively).

Master of Public Health (General)

Sr. No.	Page No.	Course Name	Credits		
			Theory	Practical	Total
		Semester I (20 Credits)			
MPH 1.1	18	Introduction to public health	2	2	4
MPH 1.2	20	Human Biology	4		4
MPH 1.3	21	Demography	2		2
MPH 1.4	22	Epidemiology	5		5
MPH 1.5	23	Biostatistics		5	5
		Semester II (25Credits)			
MPH 2.1	27	Infectious diseases	4		4
MPH 2.2	29	Immunology	4		4
MPH 2.3	30	Nutrition	4		4
MPH 2.4	31	Diagnostics		1	1
MPH 2.5	32	Applied Research Methods		7	7
MPH 2.6	33	Public Health Internship		5	5
		Semester III (30Credits)			
MPH 3.1	36	Non-communicable diseases	5		5
MPH 3.2	37	Health of women, children and the elderly	6		6
MPH 3.3	39	Nutrition Practicum		5	5
MPH 3.4	40	Health Planning	4		4
MPH 3.5	40	Environmental, Occupational and Urban Health	3		3
MPH 3.6	41	Research Project I		5	5
MPH 3.7	42	Communication Skills		2	2
		Semester IV			
MPH 4.1	45	Proposal writing		3	3
MPH 4.2	41	Research project II		5	5
MPH 4.3	45	Analyzing Qualitative Data		2	2
MPH 4.4	46	Health Behavior and counselling	2		2
MPH 4.5	46	Management of health service organizations evaluation	5		5
MPH 4.6	48	Social Epidemiology	3		3
And any one of / from other courses:					
MPH 4.7	49	Human Development and Health	5		5
MPH 4.8	50	Plural systems of medicine	5		5
MPH 4.9	51	Indian Society	5		5
MPH 4.10	52	Advanced Epidemiology	5		5

Master of Public Health (Maternal and Child Health Specialization)

Sr. No.	Page No.	Course Name	Credits		
			Theory	Practical	Total
		Semester I (20 Credits)			
MPH 1.1	18	Introduction to public health	2	2	4
MPH 1.2	20	Human Biology	4		4
MPH 1.3	21	Demography	2		2
MPH 1.4	22	Epidemiology	5		5
MPH 1.5	23	Biostatistics		5	5
		Semester II (30 Credits)			
MPH 2.1	27	Infectious diseases	4		4
MPH 2.2	29	Immunology	4		4
MPH 2.3	30	Nutrition	4		4
MPH 2.4	31	Diagnostics		1	1
MPH 2.5	32	Applied Research Methods		7	7
MPH 2.6	33	Public Health Internship		5	5
*MNS 2.5	104	Nutrition Assessment (Practical)		5	5
		Semester III (29 Credits)			
MPH 3.1	36	Non-communicable diseases	5		5
MPH 3.2	37	Health of women, children and the elderly	6		6
MPH 3.4	40	Health Planning	4		4
MPH 3.5	40	Environmental, Occupational and Urban Health	3		3
*MPH 3.6	41	Research Project I		5	5
MPH 3.7	42	Communication Skills		2	2
*MPH 3.8	42A	Maternal and Child Nutrition	4		4
		Semester IV (23 Credits)			
MPH 4.1	45	Proposal writing		3	3
MPH 4.2	41	Research project II		5	5
MPH 4.3	45	Analyzing Qualitative Data		2	2
MPH 4.4	46	Health Behavior and counselling	2		2
MPH 4.5	46	Management of health service organizations evaluation	5		5
MPH 4.6	48	Social Epidemiology	3		3
MPH 4.11	53	Review		1	1
*DS 3.2	112	Micronutrient Defeciciency Disorders	2		2

Master of Public Health (Community Nutrition)

Sr. No.	Page No.	Course Name	Credits		
			Theory	Practical	Total
		Semester I (26 Credits)			
MPH 1.1	18	Introduction to public health	2	2	4
MPH 1.2	20	Human Biology	4		4
MPH 1.3	21	Demography	2		2
MPH 1.4	22	Epidemiology	5		5
MPH 1.5	23	Biostatistics		5	5
*MNS 1.2	95	Basic Nutrition	4		4
*MNS 1.3	97	Applied Nutrition	2		2
		Semester II (25 Credits)			
MPH 2.1	27	Infectious diseases	4		4
MPH 2.2	29	Immunology	4		4
MPH 2.3	30	Nutrition	4		4
MPH 2.4	31	Diagnostics		1	1
MPH 2.5	32	Applied Research Methods		7	7
*MNS 2.5	104	Nutrition Assessment (Practical)		5	5
		Semester III (33 Credits)			
MPH 3.1	36	Non-communicable diseases	5		5
MPH 3.2	37	Health of women, children and the elderly	6		6
MPH 3.3	39	Nutrition Practicum		5	5
MPH 3.4	40	Health Planning	4		4
MPH 3.5	40	Environmental, Occupational and Urban Health	3		3
*MPH 3.6	41	Research Project I		5	5
MPH 3.7	42	Communication Skills		2	2
MPH 3.9	42B	Preventive Nutrition	4		4
*MNS 3.1	108	Applied Nutrition (Practical)		4	4
		Semester IV			
MPH 4.1	45	Proposal writing		3	3
MPH 4.2	41	Research project II		5	5
MPH 4.3	45	Analyzing Qualitative Data		2	2
MPH 4.4	46	Health Behavior and counselling	2		2
MPH 4.5	46	Management of health service organizations evaluation	5		5
MPH 4.6	48	Social Epidemiology	3		3
MPH 4.11	53	Review		1	1

MPH
Semester I

Explanatory note on Semester I Courses

Semester I has 16 credits of classroom based teaching and 4 credits of practical work (Field and Computer lab.). There are five main courses:

MPH 1.1 Introduction to public health : This course has 2 classroom-based credits (MPH 1.11 Introduction to public health concepts and issues), and is supported with 2 credits of field-based learning. The field based courses aim at introducing students to the organizational structure and the functions of the public health system and an understanding of community demographics, socio-economic status, types and distribution of diseases and disorders in a community, and a community perspective of the factors determining utilization of health services.

MPH 1.2 Human Biology is aimed at providing knowledge on the functioning of the human body, and the human life cycle. This course is optional for students from a clinical background.

MPH 1.3 Demography is an introductory course to population sciences.

MPH 1.4 and **MPH 1.5 Epidemiology and Biostatistics** courses will involve theoretical as well as practical training. Biostatistics course includes computer-based work, which will provide students the opportunity to use various epidemiological and statistical software.

Students opting for **Community Nutrition** specialization will take two additional courses (MNS 1.5 Basic Nutrition and MNS 1.6 Applied Nutrition) from the Nutrition Sciences programme.

MPH 1.1 Introduction to Public Health

MPH 1.11 Public Health Concepts and Issues

Credits: 2

Course Objective :

- To introduce students to the field of public health
- To give an overview of the determinants and measures of health
- Status of health and disease: global and national

Course

1. Definition and determinants of health
2. Public Health: Evolution of the science of public health
3. Prevention
4. Determinants of Health –
 - Nutrients
 - Lifestyle
 - Socio – economic
 - Genetic
5. Epidemiological Transition
6. Global Health
7. Functional organisation of the public health system in India and categorical health services, overview of national health and family welfare programmes
8. Primary Health Care
9. Millennium Development Goals
10. India : health indicators, urban-rural profile, National Rural Health Mission

MPH 1.12 Public health concepts and issues: Practical exercises

Credits : 2

Course Objective:

- To introduce students to the field of public health and its various activities
- Sources of health data
- Understanding of health disparities
- Contemporary issues in public health
- To understand socio-economic and demographic characteristics of the community and the distribution and types of disease in the community

Course:

The course will involve field study, data collection, analysis and reporting of :

1. Community perceptions on health and disease
2. Sources of health data –
 - Birth and Death Registries
 - Disease Registries
 - Population – based data, eg. NFHS data
3. Sources of Global Health Data
4. Comparison of health indicators of selected developed and developing countries
5. Functional organisation of the public health system –
 - Primary Health Centres (PHCs)
 - Sub – Centres (SCs)
6. Data Collection so as to provide an insight into community demographics, socio – economic status, types and distribution of diseases and disorders in the community

Suggested texts:

- 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 , P.V. Sathe, A.P., Popular Prakashan, Mumbai, 1991.
- 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.

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MPH 1.2 Human Biology

Credits : 4

Course Objective:

- To provide an understanding about the structure and function of the human body

Course :

- Human life cycle
- Structure and function of organs and systems
 - o Digestive
 - o Respiratory
 - o Excretory
 - o Circulatory and lymphatic
 - o Endocrine
 - o Musculo-skeletal
 - o Nervous
 - o Reproductive

Suggested Texts:

1. Guyton Arthur C., 1991, Textbook of Medical Physiology, A Prism Book Pvt. Ltd. Bangalore
2. Horton Casey, 1994, Atlas of Anatomy, Marshall Cavendish Books, London.
3. Keele, Neil et.al, 1991, Samson Wright's Applied Physiology, Oxford University Press, Delhi.
4. Winwood R.S, J.L.Smith, 1985, Anatomy and Physiology for Nurses, Education Academic and Medicinal Publishing Division of Hodder and Stoughton, London.

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MPH 1.3 Demography

Credits: 2

Course Objective :

- To familiarize students on the fundamentals of population studies and its links with health, family planning, population policies and programmes.

Course :

- Methods of demographic data collection
- Sources of data
- Population Census
- Population composition
- World population growth
- Growth of Indian population
- Fertility
- Mortality
- Migration / urbanization
- Population projections
- Life tables
- Population policy

Suggested texts :

- 1) Principles of population Studies: Asha Bhende and Tara Kanitkar, Himalaya Pub, Houses, Mumbai, 1996
- 2) Population: John Weeks, Wordsworth pub., California, USA, 1994.
- 3) Population Transition In India: S.N.Singh, M.K.Premi, P.S.Bhatia, B.R.Publishing Corporation, Delhi, 1989.
- 4) Population in the context of India's development: P.B. Desai UGC – UNFPA project, Ahmedabad, 1987.
- 5) Demography: Peter Cox, Cambridge University Press, U.K., 1989.
- 6) Techniques of Demographic Analysis: K.B. Pathak, F. Ram, Himalaya Publishing Houses, Mumbai, 1992.
- 7) Health Monitor: Foundation for Research in Health S, Mumbai, 1990.
- 8) National Family Health Survey – 1, 2 and 3: International Institute for Population Sciences, Mumbai.
- 9) Basic Demographic Techniques and Applications – K. Srinivasan, Sage Publications, 1998
- 10) World Population Prospects, United Nations Population division, Department of Economic and Social Affairs

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MPH 1.4 Epidemiology

Credits : 5

Course Objectives:

To familiarize students on concepts and use of epidemiology, methods to measure and describe health of populations and risk measurement

Course:

- Historical aspects, definition, aim and uses
- Descriptive epidemiology
- Determinants of disease, Natural history of disease
- Epidemiological principles in prevention and control disease
- Risk measurement, Measurement of morbidity and mortality: Incidence, Prevalence, Age-adjustment and survival analysis, use of morbidity and mortality
- Epidemiological study designs
- Bias, confounding and interaction
- Causal association
- Nutritional surveillance

Suggested texts :

1. Gordis Leon Epidemiology (3rd edition) ,W B Saunders and Co.
2. Beaglehole. R. Bonita, et. al Basic Epidemiology :, WHO Publication, Geneva, 1993.
3. David E., et. al. Foundations of Epidemiology : Oxford University Press, New York, 1984.
4. Barkar, D.J.P., Practical Epidemiology : Churchill pub, Livingstone, 1982.
5. Epidemiology in health care planning : E.A. Knox (ed), Oxford University Press, New York, 1979.
6. Katz Mitchell: Study Design and Statistical Analysis: A Practical Guide for Clinicians
7. Last, J.M., Spasoff, R.A. Harris, S. S. and Thuriaux, M.C. (Eds): A Dictionary of Epidemiology, Oxford University Press, New York, 4th Ed., 2001.
8. Mayer Dan Essential Evidence-Based Medicine Series: Essential Medical Texts for Students and Trainees
9. Silman and McFarland: Epidemiological Studies A Practical Guide 2nd Edition
10. Aschengrau and Seage: Essentials of Epidemiology in Public Health
11. Friis Robert: Epidemiology for Public Health Practice, Third Edition

12. Timmreck Thomas C: An Introduction to Epidemiology, Third Edition
2002
13. Szklo Moyses: Epidemiology: Beyond the Basics -
2003

MPH 1.5 Biostatistics

MPH 1.51 Principles of Biostatistics

Credits: 3

Course Objective:

- To introduce students to the use of bio-statistics in health sciences

Course :

- Levels of measurement
- Measures of central tendency, Measures of variability, Skewness, Kurtosis
- Probability and Binomial, Poisson, Normal and t Distribution
- Sampling methods
- Confidence Intervals for mean(s) & proportion(s)
- Test of Significance
- Nonparametric tests
- Association and Causation
- Correlation and regression
- Analysis of Variance
- Multivariate analysis

MPH 1.52 Statistical Analysis

Credits: 2

Course objectives:

- To make students aware of pitfalls in statistical analysis
- To train students in presentation and interpretation of data
- To impart examples of utilization of data in decision making
- Training in usage of appropriated statistical software and in handling of large datasets

Course:

- Data entry, analysis, presentation
- Training in statistical software SPSS

Suggested texts:

1. An Introduction to Biostatistics: A manual for students in Health Sciences: P.S.S. Sundar Rao, J. Richard Prentice Hall , New Delhi, 1996.
2. Bio-Statistics: A foundation for Analysis in the Health Sciences: Daniel, W.W., John Wiley and Sons Pub., Canada, 1991.
3. 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.
4. Bio-Statistics perspective in Health care research and practice : Verma, B.L., Shukla, G.D., et., al , C.B.S. Pub. New Delhi 1993.
5. Handbook of Statistics: Krishnaiah, P.K. Rao, C.R. (ed), Elsevier Science Pub. Netherlands, 1988.

SEMESTER II

Explanatory note on Semester II Courses

Semester II has 12 credits of classroom based teaching, 1 credit of exposure to laboratory diagnostic methods and the remaining credits are dedicated to field based work, as well as extensive computer based analysis of data .The courses being offered are:

MPH 2.1 Infectious diseases and MPH 2.2 Immunology courses provide knowledge on the epidemiology of infectious diseases, basic immunology and immunization, and national infectious disease control programmes

MPH 2.3 Nutrition introduces students to the principles of nutrition and Community nutrition.

MPH 2.4 Diagnostics provides exposure to principles and methods of laboratory diagnostics for common diseases of public health relevance and includes on site visits and demonstration of diagnostic paradigms and methods

MPH 2.5 Applied Research Methods introduces students to research methods, research ethics and methods of community diagnosis using survey methods. Students will in addition be introduced to qualitative research methods.

MPH 2.6 Public Health Internship is aimed at providing practical experience in a public health facility. Students opting for **MCH** specialization will intern with appropriate maternal or child health programme.

MNS2.4 Students opting for **CN** specialization will have a 5 credit practical on Nutrition Assessment.

MPH 2.1 Infectious diseases

Credits: 4

MPH 2.11 Introduction to Microbial Pathogenesis

Credit: 1

Course objective :

- To understand the biology of microbes and the mechanism of colonization and disease causation

Course :

- Structure of prokaryotic cell
- Pathogenic modifications
- Mechanisms of breaching host defenses
- Mechanisms of production of disease
- Anti-microbial agents, mode of action, drug resistance

MPH 2.12 Epidemiology and Control of Infectious Diseases

Credits: 3

Course Objective:

- To understand the pathology, pathogenesis, clinical manifestation, mode of transmission, prevention and control of diseases of bacterial and viral etiology
- To orient students about the national disease control programmes,
- Critical evaluation of various disease control programmes
- To evaluate the impact of disease control programmes on epidemiology of the disease

Course:

-General overview of infectious diseases and their impact in developing countries. Biology, pathogenesis and pathology, clinical presentation, of common infections

a.

- Vaccine preventable diseases: TB, polio, diphtheria, tetanus, and measles.
- Respiratory: Tuberculosis, leprosy, ARI's

b. Intestinal: Diarrhoea, typhoid, and worm infestations

c. Contact: STDs and AIDS

d. Vector borne: Plague, rabies, malaria and filaria, JE, dengue, leptospirosis

Classroom lectures to be supported by demonstration of slides and specimens as relevant.

National disease control programmes for
Vector Control

Tuberculosis
AIDS
Diarrheal disease
Leprosy
Other national disease programmes

Suggested texts :

1. Duguid et al. Textbook of Medical microbiology
2. Greenwood et al. Medical microbiology
3. Mims C A: Medical microbiology
4. Javetz and Melnick : Adelbergs Medical Microbiology
5. William and Wilkins : Mechanisms of microbial disease
6. Sherris: Medical Microbiology
7. World Health Organization: Report on infectious diseases, and Report on Multidrug resistance , World Health Organization, Geneva
8. Principles and Practice of Medicine: Davidson, Edward, Bouchier et. Al., Pearson Professional Ltd. London, 1995
9. Biology of Disease: Jonathan Phillips, Paul Murray, Blackwell Science Ltd. Australia, 1995
10. Practical Medical Microbiology: Mackie and M.C. Cartney, Longman Group, U.K. 1995
11. Human Virology : A textbook of Students of Medicine and Microbiology, Dentistry, Leslie collier, John Oxford, Oxford University Press, Tokyo, 1993
12. Textbook of Medicine : Cecil, Bennett, et al., Harcourt Brace Joanvich Inc. U.S.A. 1992
13. Medical microbiology: Greenwood et al., Churchil Livingstone Longman group, London, 1992
14. Textbook of Medical Parasitology : Jayram Paniker, Jaypee Brothers, New Delhi, 1993
15. Nelson K E : Infectious disease epidemiology : theory and practice
16. Epidemiologic methods for study of infectious diseases Ed J C Thomas, D J Weber
17. Griesecke J: Modern infectious disease epidemiology

MPH 2.1 Immunology

Credits: 4

Course Objective:

- To understand the principles of immune function and immunization

Course:

- 1) Immunology, introduction and scope.
- 2) The organs and the cells of the immune system
- 3) Constitutive and induced defenses of the body
- 4) Immunization principles and vaccine use
- 5) Vaccines for Routine Use

Suggested texts:

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

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MPH 2.3 Nutrition

MPH 2.21 Principles of Human Nutrition

Credits: 2

Course objectives:

- Understand the role of nutrients in the body.

Course:

- Introduction: the relationship between nutrition, health and disease
 - Proximate principles
 - Digestion absorption, metabolism of carbohydrates, proteins and lipids
 - Energy
 - Water
 - Minerals
 - Vitamins
- Concept of nutrition in Indian Systems of Medicine

MPH 2.22 Community Nutrition

Credits: 2

Course objective :

- To understand the common nutritional disorders: physiological basis, measurement, interventions

Course:

- Recommended dietary allowances
- Nutrition throughout life cycle
- Malnutrition and Chronic Energy Deficit
- Micronutrient disorders
- Maternal and child nutrition
- Methods of promoting dietary change

Suggested texts:

- 1) Advanced textbook on food and Nutrition: Dr. M Swaminathan, The Bangalore Publishing Co. Ltd. Bangalore, 1974
- 2) Recent Trends in Nutrition: C Gopalan, Oxford University Press, New York 1993.

- 3) Nutrition for Developing Countries : E. Savage King , Oxford University Press, Oxford, 1992.
- 4) Nutrition problems and Programmes in South East Asia: Dr. C. Gopalan, World Health Organization, New Delhi, 1987.
- 5) Perspective in Nutrition: Gordon M. Wardlaw, Paul M. Injel, Time/Mosby College Publishing, St. Louis, 1990.
- 6) Fundamentals of food and Nutrition: Sumati R. Mudambi, M.V. Rajagopal, V.R. Damodharan, Wiley Eastern Ltd. New Delhi, 1982.
- 7) Clinical Dietetics and Nutrition, F.P. Antia, Oxford University Press, Delhi, 1993.
- 8) Human Nutrition and Dietetics, J.S. Garrods & W.P.T. James, Churchill Livingstone, London, 1993.
- 9) Nutritional Sciences: Sreelakshmi

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MPH2.4 Diagnostics

Credits 1

Course objective

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

Course :

Demonstration/study of

- Diagnosis of tuberculosis – demonstration of diagnostic algorithm for detection of sputum positive and negative cases, laboratory demonstration of acid fast bacilli, culture and staining
- Diagnosis of malaria--- thick and thin film preparation, identification of parasites
- Study of entomological specimens
- General bacteriological methods—gram staining and antibiotic susceptibility testing
- Stool culture and selective and enrichment procedure for microorganisms
- HIV/AIDS – CD4 counts, ELISA and Western blotting

-Hematological methods

-Water testing

Suggested texts:

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

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MPH2.5 Applied Research Methods

Credits: 7

MPH 2.51 : Scientific Research Methods

Credits: 2

Course Objective:

- To introduce students to research methods
- To impart knowledge on ethics of research, including bioethics, ethical use of animals

Course

- Types of research
- Steps in conducting research
- Overview of the philosophical foundations of the principles of medical ethics
- Issues of patient and professional autonomy, beneficence and non-maleficence, confidentiality, informed consent, and distributive justice with applications to contemporary issues
- Monitoring of ethical issues: ethics committees, institutional review boards, and community advisory boards.

MPH 2.52 Survey methods I

Credits 5

Course objective:

- To train students in community diagnosis
- 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:

Sampling and survey methods and their application to public health research.

Survey design and planning, Interview schedule, questionnaire construction,
Data collection, Data management, Data coding procedures

Qualitative research methods

Execution of a survey including –designing questionnaire, designing analysis tables,
entry of data, analysis of collected data, evaluation of results, report writing, presentation
of data

MPH2.6 Public Health Internship

Credits: 5

Course objective:

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

Course :

Six-weeks internship at a public health facility, (sub-centre to district level) 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.

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SEMESTER III

Explanatory note to Semester III

Semester III has 18 credits of classroom based work, 5 credits of field based diet survey, and a research project (5 credits) which is to be completed over two Semesters (Semester III and IV) as part time study.

MPH 3.0 The course on **Health of women, children and the elderly** is aimed at providing an insight into the health of vulnerable groups and the various policies and their impact.

MPH 3.1 Non-communicable diseases provides knowledge on the epidemiology of non-communicable diseases with an emphasis on methods of health promotion.

MPH 3.2 Nutrition practicum provides the practical skills for undertaking diet surveys.

MPH 3.3 Health planning provides a basic perspective of health development at both micro and macro level.

MPH 3.4 Research project allows the students to practically implement the theoretical knowledge as a small research study

MPH 3.5 Environmental, occupational and urban health

Internship: NGO, health services or clinic-based depending on selected research topic.

MCH specialization will involve Dissertation focusing on issues pertaining to maternal and child health, and 4 specialized credits on Maternal, Child and Adolescent Nutrition (MNS 3.1).

MPH 3.1 Non-communicable diseases

Credits: 5

Course Objectives :

To give an understanding of the pathophysiology of some common NCDs. Classification, biochemistry, 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:

Overview and introduction to NCDs, Pathophysiology (including biochemical and genetic parameters), cardinal signs, clinical and diagnostic features (with special emphasis on biochemical parameters), treatment (please emphasize pharmacological component) prevention and control

- a. Asthma
- b. Cancer
- c. Cardiovascular diseases
- d. Chronic rheumatic diseases
- e. Diabetes
- f. Tobacco/alcohol/substance-abuse related illnesses and their control
Tobacco use Tobacco related illnesses and tobacco control
- g. Obesity

Epidemiology of NCDs, risk factors, global profile and predictions prevention and control of NCDs

Health promotion strategies, methods and activities

Role, nature and practice of advocacy in health promotion practice

Mental Health : Classification, biochemistry, clinical manifestations, diagnosis and treatment and intervention and support services

Concept of Mental Health

Burden of Mental diseases

Depression, Schizophrenia, Alzheimer's, Parkinson's, Senile dementia ,Suicides

Substance Abuse

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MPH 3.2 Health of women, children and the elderly

MPH 3.21 Reproductive health

Credits: 2

Course Objective:

To orient students about physiological basis of reproduction and reproductive health issues

Course:

Reproductive anatomy and physiology

Physiological basis of pregnancy, childbirth, lactation

Abortion, Contraception, Medical Termination of Pregnancy Act

Adolescent health

Adolescent sexuality

Maternal mortality

STIs/RTIs: diagnosis, treatment, prevention

Infertility

Menopause and beyond

MPH 3.22 Gender Issues

Credits: 1

Course Objectives:

a) To study various gender issues, concepts, basis and formation, their impact on health

b) To study emerging concepts in reproductive health and link to gender issues

Course:

Concept of Gender

Social structure and gender

Gender discrimination,

Consequences of gender discrimination other than health area,

Gender in the context of development

Gender and health

Violence against women

Global issues related to gender

Legal aspects related to gender: MTP, Sex Determination, Prostitution, homosexuality etc.

MPH 3.23 Reproductive Health Policies

Credits: 1

Course Objectives:

To introduce students to national and international reproductive health policies and their impact on current family welfare programme

Course:

Reproductive Health Indicators
Family welfare services in India, current status

Population Policy: Health planning in terms of Family planning, Health services, Vital processes. Policies influencing demographic processes in the context of India's population

Reproductive Health Policies: in India, global initiative - WHO, UN, Cairo conference, Beijing conference

MPH 3.24 Child health**Credits: 1****Course Objectives:**

To impart holistic knowledge on child health issues including growth and development, childhood illness, child health practices, risk groups, child health and nutrition services.

Course:

Growth and Development from infancy to childhood

Neonatal, infant and child mortality

Breastfeeding, weaning and supplementary feeding

Global scenario

Initiatives, programmes and policies related to child health and development

Health of physically and mentally challenged children, behavioural disorders, child abuse etc

MPH 3.25 Ageing**Credits: 1****Course Objectives:**

To impart knowledge on the various dimensions of ageing to improve quality of life

Course:

Introduction to gerontology

Biology of ageing

Demographic and social profile of the elderly

Health problems and status of the elderly

Policy planning and legislation for aged.

Suggested texts:

Dutta DC 2005. Textbook of Obstetric and Gynaecology, Rawat Pub.

Gupta SD 2005. Adolescent and Youth reproductive health in India.

Jejeebhoy S. 1998. Adolescent sexual and reproductive health in India: review of the evidence from India. Social science and medicine; 46-10.

Lancet Series on Child Survival 2003

Lancet Series on Neonatal Health care 2005

Powell JL. 2003 Theorising Social gerontology

SUSAN DE VOS. 2004. Revisiting the classification of household composition among elderly people. Journal of Cross-Cultural Gerontology 19: 135–152.

United Nations International Research and Training Institute for the Advancement of Women (INSTRAW). 2003. The Situation of Elderly Women Available Statistics and Indicators

Behraman R, Kliegman R, Jenson Hal (Edt) 2001.Nelson’s Textbook of Paediatrics. Harcourt Pub.

R.K.A. SUBRAHMANYA. 2003. Adapting social security schemes to the challenges of a life long society: The Indian Experience. 4th International Research on Social Security Report. Antwerp.

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MPH 3.3 Nutrition practicum

Credits: 5

Course Objective:

To train students in methods of assessing nutritional status

To familiarize students with nutrition intervention practices in public health and nutrition policies and their impact

Course:

Objectives/ importance of assessing nutritional status

Methods of assessment

Direct----- anthropometry, biochemical, clinical, diet surveys

Indirect---- vital health statistics, ecological data

Intervention objectives

Components of intervention

Techniques of implementation --- selection of beneficiaries

Monitoring and surveillance

Nutrition programmes in India

Production of nutritious foods, fortification

Nutrition planning and nutrition education

Nutritional indicators of India

Execution of a small project involving various nutritional assessment methods, report submission

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MPH 3.4 Health Planning

Credits: 4

Objectives:

1. To understand the basic principles of health planning
2. To understand the history of health planning in India

Course:

History of health planning in India
Development of National Health Policy, ISM policy
Concept of Planning, Health Planning Models
National Family Welfare and Disease Control programme and their impact on health indicators
Role of Health Planning in Primary Health Care
Role of NGOs in health planning and development
Micro and Macro level planning

Suggested texts:

1. National Health and Research Policy Documents
2. Expert Committee Report on Public Health Systems in India 1996
3. Government Publications on NDCPs.

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MPH 3.5 Environmental, occupational and urban health

MPH 3.51 Environmental Health

Credits: 1

MPH 3.52 Occupational Health

Credits: 1

Course Objectives:

To identify by type the major sources of environmental and occupational health hazards
To list strategies used to evaluate and recognize health hazards

Course :

Sources of environmental health hazards
Water: uses and sources of drinking water, water purifying methods,
Wastewater treatment methods, water quality management
Air Quality: types and sources, body's response to air pollution, indoor air
Pollution, control of air pollution

Environmental toxicology
Health risk assessment methods
Occupational Safety & Health: Chemical and physical exposures, control of occupational exposures, injury control

Suggested texts:

Moeller, D.W. Environmental Health Harvard University Press, 2004

MPH 3.53 : Urban Health

Credit 1

Course Objective:

To understand the determinants of urban health

Course:

Urban population: demography and trends
Determinants of urban health
Consequences of urbanization and
Urban health services
Concept of urban health planning

MPH 3.6 Research project I

Credits: 5

MPH 4.2 Research project II

Credits: 5

Course Objectives:

To train students in all aspects of executing a research project.

Course:

To train students in execution of research projects through a small study
The course will include selection of a topic, selecting the research design, planning and implementation of the research project, analysis of the results and presentation of the work as a written dissertation. Dissertation to be completed over two semesters of part-time study.

MPH 3.7 Communication Skills

Credits : 2

Course objectives :

To teach communication skills

ICFYI module will be used as an illustrative example.

Course :

- Infant & Young Child Feeding and Counselling : Family & Society support, Newborn Caring Practices; Baby Friendly Hospital; Complementary Feeding; LBW babies& Kangaroo Mother Care;
- HIV, IMS Act & Ethical Issues
- Community Awareness Programmes: Problem oriented approach for mother's problems;
- Pre-Delivery Counselling & Community Awareness
- Listening & Learning Skills: Theory, Exercises
- Building Confidence & Giving Support: Theory, Exercises
- Field Visit 1: Maternity Home Visit: Counselling Practice; Positioning & Attachment Skills; Expression of Breast Milk, Initiation by Breast Crawl;
- Field Visit 2: Community Visit: Counselling Practice
- Field Visit 3: Awareness Drives for Adolescents, Pregnant & Lactating mothers, Senior Citizens, Working Mothers, Self Help Groups, Village Council etc

MPH 3.8 Maternal, Child and Adolescent Nutrition

Credits: 4

Course objective:

The course is aimed to providing an insight into the specific nutrient needs for mothers, children and adolescents, various policies and their impact.

Course:

Nutritional requirements through the life cycle – pregnancy, lactation, infancy, pre-school, school going, adolescence, elderly.

- Physiology and special needs during pregnancy, lactation, infancy, childhood and adolescence, caloric requirements, iron and folic acid supplementation.
- Relationship between maternal diet and pregnancy outcome.
- Overview of the physiological and biochemical process underlying human lactation and nutritional needs for both mother and infant.
- Maternal health and nutritional status, source of data, maternal mortality and issues relating to maternal health, gender issues and maternal health.
- Role of nutritional factors in embryonic and postnatal development.
- Relationship among nutrition, growth, and development during childhood and adolescence.
- Child health and morbidity, neonatal, infant and child mortality, IMR and U5MR; link between mortality and malnutrition; nutritional needs and interventions for special groups, including obese children, adolescents, athletes, and eating disorders.
- Breast feeding, weaning and supplementary feeding.
- Nutritional assessment for normal and high-risk groups; psychological, social, and economic factors contributing to nutritional status.

Suggested texts:

- Ghai O.P., Management of Primary Health Care, Inter Pub.
- Weaning – from Breast milk to family food, A Guide for health and community workers, WHO& UNIC EF Pub.
- ACASH 1991, Maternity home practices and Breast feeding, Chitanakshar graphics, Bombay.
- WHO.1978,Growth Charts for international use in maternal and child health Care. Guidelines for primary health personnel.
- Elizabeth K.E.,2005, Nutrition and child Development, 3rd edition, Paras Publishing
- Dutta, D.C. Textbook of Obstetric and Gynaecology

MPH 3.9 Preventive Nutrition

Credits 4

Objective:

To provide a basic understanding of the role of preventive nutrition strategies
To examine the consequence of Public health implications of national preventive nutrition strategies in developing countries

Course:

Preventive Nutrition: overview

Prevention of malnutrition and deficiency diseases, optimal pregnancy outcomes

Prevention of life style diseases

- Cancer: Cancers prevalent in India, Identification of risk factors
- CVD: Risk, Primary and secondary prevention.
- Diabetes & Obesity: Causes and consequences
- Bone diseases: osteoporosis, osteoarthritis

Prevention of major disabilities

Cultural issues – tobacco , alcohol and associated disease risks and prevention

SEMESTER IV

Explanatory note on Semester IV Courses

Semester IV has classroom based teaching and credits from the ongoing Research project . The courses involve skill development through Proposal Writing, Analyzing Qualitative Data and Research Project. Other subjects include Human Development and Health, Medical Pluralism and Indian Society, Advanced Epidemiology, Management of Health Service Organization and Evaluation, Social Epidemiology and Indian Society and Health Behavior and counseling.

For students opting for MCH specialization, 5 credits on micronutrient deficiency disorders and improving health and nutrition through behavior change communication (courses MNS4.1 and 4.5) are offered. A one credit review on current status of maternal and child health will be mandatory. Students will submit Dissertation by end of this Semester.

For students opting for CN specialization, 3 credits on improving health and nutrition through behavior change communication (courses MNS 4.5) is offered. A one credit review on current status of community nutrition will be mandatory. Students will submit Dissertation by end of this Semester.

MPH4.1 Proposal Writing

Credits: 3

Course objectives:

- To impart training in the methodology of developing a research proposal
- Funding agencies and their submission requirements

Course:

Development of a research proposal or fellowship application. Protocol to include ethical guidelines and other regulations.

MPH4.3Analysing Qualitative Data

Credits : 2

Objective:

- a) To orient students to various methods of analysis of qualitative data

Course contents:

- 1) Introduction to qualitative data analysis
- 2) Analytic approaches, methods, and techniques
- 3) Selecting appropriate qualitative data analysis technique
- 4) Presenting and interpreting qualitative analysis
- 5) Computer applications for qualitative analysis

Reading List:

1. Ritchie J and Jane Lewis. 2003. Qualitative Research Practice. London. Sage Pub.
2. Punch Keith. 2001. Introduction to Social Research: Quantitative and Qualitative Approaches. London. Sage pub.
3. Auerbach, Carl F., and Louise B. Silverstein 2003 Qualitative Data: An Introduction to Coding and Analysis. New York: New York University Press.
4. Ezzy, Douglas 2002 Qualitative Analysis: Practice and Innovation. London: Routledge.
5. Hollway, Wendy, and Tony Jefferson 2000 Doing Qualitative Research Differently: Free Association, Narrative and the Interview Method. London, Sage.
6. Wolcott, Harry F. 2001 Writing Up Qualitative Research. 2nd ed. Thousand Oaks, Ca, Sage.

MPH 4.4 Health Behaviour and Counseling

Credits: 2

Course objective:

Principles of health education and behavioral science as used in public health, emphasis on the primary social-psychological variables that may influence health and disease

Course:

Health education

1. Definitions & theory of health education
- b. Practice of health education
- c. Role of health education in health
4. Effectiveness of health education

Health communication

1. Theories related to health communication
2. Practice of health communication
3. Role of health communication in health promotion practice

Health counseling: theories and practice

Stigma and discrimination: Definitions, context and role of stigma and discrimination in health and disease

MPH 4.5 Management of health service organizations and evaluation

Credits : 5

MPH 4.51 Management of Health Services

Credits: 2

Course objective:

To familiarize students with the principles and techniques of management,
To familiarize students with the methods of management of health services at various levels, Methodologies for designing and conducting program evaluation and research in health care settings

Course:

- A survey of management theories and principles
- Essential management skills with an overview of management in health;
- Health organizational behaviour
 - Strategic planning and operational management of organisations-Govt and Non-Govt;

- Project design and management-emphasis on developing logical frameworks and action plan development
- Proposal development and fund raising for health programs
- Project cycle management-emphasis on operating and evaluation of projects
- Health financing concepts including costing, budgeting and financial management.

MPH 4.52 Non-governmental organizations

Credits: 1

Course objective:

To familiarize students with the methodology of establishing and running non-governmental organizations

Course:

Roles of NGOs in health development, historical background of voluntary activity in health in India.

Managerial challenges: strategic management and decision making, structures and systems (including monitoring and financial management),

Generation of financial resources

Interaction with public sector

MPH 4.53 Health economics

Credits: 1

Course objective:

To impart knowledge on health care financing health economics including cost-benefit and cost-utility analysis

Course:

- Health financing, budgeting and economics
- Overview on Health financing in Developing countries
- Health financing concepts such as cost and cost classification
- Budget management issues such as
- Cost-effective analysis, Cost-benefit analysis and Cost-Utility analysis;
- Economic analysis reporting for projects should be covered here.

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MPH 4.54 Disaster management and outbreak investigation

Credits: 1

Course objective:

Fundamentals of disaster and outbreak management

Course:

Introduction and scope of disaster management

Organization and responsibilities of a disaster management team

Tools and methods of disaster management

Relief operations

Disaster preparedness

Objective of outbreak response

Priority conditions

Organization and responsibilities of outbreak response team

Reporting mechanism

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MPH 4.6 Social Epidemiology

Credits: 3

Objectives

- a) To orient students to theory and methods of social epidemiology
- b) To understand social synergies contributing to current health and health care issues

Course contents

- 1) Background and History of social epidemiology:
- 2) Issues: fundamental issues in / for social Epidemiology
- 3) Theories and constructs: fundamental to social epidemiology
- 4) Measurement: methods of social epidemiology
- 5) Design and Inferences:

Reading list:

1. Berkman, L.F. and Kawachi, I, Eds. 2000. Social Epidemiology. New York, Oxford University Press
2. Oakes, JM and JS Kaufman. 2006. Methods in Social Epidemiology. San Francisco: Jossey-Bass.
3. Krieger, N. 2001. Theories for social epidemiology in the 21st century: An eco-social perspective International Journal of Epidemiology; 30:668-677

4. JE Elster, Jon. 1989. Nuts and Bolts for the Social Sciences. New York: Cambridge press
5. Porter D. 1999. Health, Civilization and the State: A History of Public Health from Ancient to Modern Times. London. Routledge.
6. Marmot, Michael. 2005. "Social Determinants of Health Inequalities." *Lancet* 365:1099-104.
7. Krieger, N. 2000. Epidemiology and Social Sciences: Towards a Critical Reengagement in the 21st Century. *Epidemiologic Review*, vol. 22-1: 155-63.
8. Oakes, J. M. and P. H. Rossi. 2003. "The measurement of SES in health research: current practice and steps toward a new approach." *Soc Sci Med* 56:769-84.
9. Kaplan, R.M., Sallis, J.F. Jr., & Patterson, T.L., Health and Human Behavior, New York: McGraw-Hill, Inc.,
10. Bird CI, Rieker PP. (1999). Gender matters: an integrated model for understanding men's and women's health. *Social Science and Medicine* 48: 745-755.

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MPH 4.7 Human Development and Health

Credits: 5

Objectives of the Course:

- a) To orient students about the basic concepts in social sciences to facilitate the Understanding of health in its socio-cultural milieu.
- b) To discuss the impact of technological development on health status and development of the community

Course:

- 1) Concept of Development: Definitions, dimensions, theoretical explanation and discussion on the basic concept. Globalization
- 2) Development Declarations and evaluation : Copenhagen, Manilla, SAARC, RWSS etc.
- 3) Human Development Indices: HDI, GDI, DALY
- 4) Millennium Development Goals
- 5) Economic development : concept of poverty as discussed in the literature of Prof. Sukhatme, Amartya Sen and others, poverty and nutrition, various other dimensions of poverty, public Distribution System, poverty alleviation schemes, interaction between economic development and health.
- 6) Non-health sector and impact on the human health: Infrastructure development and Health, Communication media and health
- 7) Society and health: Culture, Culture and personality, Culture and lifestyle, culture as integrated whole, cultural attributes and characteristics, Society, Social change, Sources of change and likely impact on human health, types of societies

- and its impact on health, Behaviour , concept of human behaviour from the perspective of management, psychology and anthropology discipline. Discussion on Health behaviour, various models of health behaviour
- 8) Health as human right: Basic human rights, and health as human right, Concept of Health in Indian Constitution : Concept of welfare state, Fundamental rights and duties, Directive principles, etc.

References :

- Narayana, K.V. Health Development, Rawat Pub, 1997
Morros, F. The meaning of Culture, Lexington Prees,1972
Pelto, B (edt), Technology and Social Change, 1987
Berreman, G.D. Social Inequality : Comparative and Development Approaches, Academic Press, 1981.
Edmandson and Sukhatme, Diet Disease and Development , Macmillan Pub,1992.
Human Development Reports published annually, UNDP.

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MPH 4.8 Plural Systems of Medicine

Credits: 5

The study of plural systems of medicine is based on treating all systems of medicine as equidistant.

Course objectives:

- To recognise and appreciate the functioning od medical pluralism in India in tune with cultural similarities and diversities.
- To provide knowledge base for integrating plural systems in health care.

Course:

1. Historical development of medical pluralism in India: ancient India, Medieval times, Pre and post Independence.
2. Basic principles of AYUSSH System: their congruence and divergence
3. Medical education in plural systems.
4. Research and Industry perception in plural system
5. Contribution of plural systems in the treatment of communicable and non-communicable diseases.
6. Role of plural systems in national health care with focus on women and child health, adolescence and geriatric health care and promotion.
7. Congruence of plural systems under NRHM.

8. Administrative infrastructure for management of plural systems in medical education and public health.
9. Local health traditions: Indigenous practice and providers.
10. Medical pluralism: International forums such as UNICEF, WHO and international accreditation.
11. National Health and ISM Policies.

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MPH 4.9 Indian Society

Credits : 5

Objectives of the Course:

- a) To orient students to the basic concepts of Indian culture and community life.
- b) To discuss the concept to community health from socio-cultural perspective.

- 1) Basic Concepts in Indian Society : Marriage, Family and Kinship and their interpretation from health point of view. Consanguineous marriage and its consequences in terms of health.
- 2) Caste system: Varna system, caste characteristics, and caste as a group and caste as an institution. Caste dynamics and process of Sanskritization, inter caste relationship, Changing system of caste, concept of dominant caste, Modernization, Westernization, etc. Scheduled castes and backward castes, criteria for selection, role of the commission, Views and efforts of Gandhi and Ambedkar, Impact of caste dynamics on the health of the community.
- 3) Indian villages: Traditional and contemporary village in India, Balutedari system, village and individual life cycle, panchayati raj and villages. Changes in the village life, impact of population explosion, migration, mobility, land-human ratio, industrialization on health of the village society. Role of Grampanchayat, Govt. development programs- IRDP, etc. schemes, its impact. Urbanization: Process of Urbanization, health effects of urbanization, urban life style across different socio-economic levels, professionals to slum dwellers, culture of ghetto, urban health problems.
- 4) Tribal Communities and health : Difference between tribe and caste, Basic tribal organization of society , characteristics of tribal life. Difference between folk and urban community, status of women – compare between caste and tribal women. Difference between tribe and Scheduled tribe, Scheduled tribe’s identification criteria, constitutional provisions. Distinct health problems of tribal communities and why explain with examples, description of environmental, geographical and cultural factors leading to morbidity and mortality. Development of tribal belts, various schemes of development, ITDP, Nav – Sanjivan yojana, etc. Evaluation of schemes and impact.

References :

1. Wonder That Was India: A.L. Basham , Chap. 5

2. India's Villages: ed. by M.N. Srinivasan : chapter -1 Introduction
3. Tribal Culture in India: L.P. Vidyarthi
4. Society in India: David Mandelbaum.
5. Caste in Modern India and Other Races : by M.N. Srinivasan,
6. Kinship in India: Iravati Karve: Introductory chapter
7. Village India: Mackim Marriot :
8. Indian Villages: S.C. Dube

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MPH 4.10 Advanced Epidemiology

MPH 4.101 Clinical/field trial methodology

Credits 3

Course Objectives:

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

- a) Understand the general principles of clinical trials research, including the regulatory and ethical principles and guidelines
- b) Have a theoretical idea about the design conduct and analysis of clinical Trials

Course:

Clinical trials:

History of the development of the clinical trials research process
 Introduction to the relevant legal and ethical guidelines governing clinical trials design
 Introduction to the phases of clinical trials research
 Designing trials
 Determining sample size
 Single and multicentre trials
 Techniques for randomization
 Data collection management and endpoints
 Recruitment and retention of trial participants
 Standard Operating Procedures (SOP's)
 Adverse events and serious adverse events (SAE's)
 Interim monitoring
 Budgeting men and materials
 Quality control
 Publications and data dissemination

MPH 4.102 Systematic reviews and Meta-analysis

Credits: 2

Course objectives:

- An understanding of the use and method of systematic reviews

Course

- Planning the review
- Conducting the review
- Selection of studies
- Study quality assessment
- Data extraction and monitoring progress
- Data synthesis
- Reporting and dissemination
- Literature searching
- Software for performing meta-analysis

MPH 4.11 Review

Credits: 1

Course objectives:

- a) To train students in the method of review writing
- b) To update knowledge on the status of maternal and child health/ community nutrition

Course:

Students to identify, read, analyse and write a review on peer-reviewed research and seminal articles in the field.

SYLLABUS

Master of Science Health Sciences (M.Sc H.Sc)



**Interdisciplinary School of Health Sciences
University of Pune**

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Background

Traditionally, the role of public health laboratories have been to provide support in the prevention and control of disease through surveillance, through the confirmation of etiology during outbreak investigation, and in environmental health surveillance. In contrast with this role of the laboratory in public health, the Health Sciences course focuses on population studies through incorporating both epidemiologic and laboratory skills.

The Health Sciences course includes an interdisciplinary set of skills, initiated with a strong understanding of the determinants of health, the concept of public health, the development of health planning in the country, the evolution and impact of various national health and family welfare programmes in the country, as well as an understanding of the community and its practices. This knowledge, in combination with field based study during the first year of the course, provides the context in which skills and knowledge from pertinent laboratory sciences (primarily microbiology, immunology, biochemistry, genetics and molecular biology) are imparted. Thus the course looks beyond traditional training of students in applications of laboratory sciences in epidemiologic activities, but provide research skills, grounded in a realistic understanding of the public health context in India. It is expected that these students will assist in formulating public health policies by producing data which uses an interdisciplinary set of methods. The course also aims at creating a new breed of public health professionals, who will have the ability to understand, evaluate and be able to enunciate the legal, regulatory, social and ethical needs as newly emerging health technologies (recombinant vaccines, stem cell technology, cord blood banking to name a few examples), impinge on the health system of the country.

Goal of the MSc H.ScS programme

To develop human resource with a combination of skills in epidemiology and laboratory sciences

Objectives of the MSc H.ScS programme

- a) to impart knowledge about the status of health and disease in India and methods of disease prevention, control and health promotion
- b) to train students in methods of studying health and disease in populations with a focus on epidemiology and biostatistics
- c) to provide students with theoretical and practical knowledge in the basic and the recent advances in the fields of microbiology, immunology, molecular biology, biochemistry, and genetics with specific reference to

health and disease through appropriate theoretical and laboratory based training

Skills and Competencies to be imparted

- theoretical and laboratory based skills in microbiology, biochemistry, immunology, genetics and molecular biology
- epidemiologic research designs and methods including methods for sampling, evaluation of diagnostics
- training in statistical methods

Career opportunities

The M.Sc Health Sciences programme will provide career and employment opportunities for students in academic, national and international health organizations, and in research and academic institutions.

Eligibility

BSc. any subject including Nursing, Home Sciences and Nutrition, Degree in any branch of Medicine or Pharmacy from any statutory University or recognized as equivalent there to by the University of Pune, with at least 50% for open and 45% marks for reserved category students.

Number of seats : 10

Fees : As per rules of University of Pune

Teaching and evaluation

MSc Health Sciences is offered as a two year full time course. Students need to complete 100 credits in order to obtain the Masters degree. 75 credits are compulsory from the School. Remaining 25 credits can be taken from any other post-graduate department of the University of Pune, (those courses which are under the University credit system). The two-year course is organized into four teaching Semesters. Each Semester consists of 15

weeks of teaching. One credit hour is equivalent to 15 hours of teaching. There is one hour of assessment for every 4 hours of teaching. Assessment may be in the form of evaluation of long/short written answers, multiple choice questions, presentation, term papers, assignments etc. 40% of assessment is done during term so that there is continuous evaluation of the student, 60% assessment is done at the term end examination (held around May and November respectively).

M.Sc. Health Sciences

Sr. No.	Page No.	Course Name	Credits		
			Theory	Practical	Total
Semester I (25 Credits)					
SHS 1.1	60	Introduction to public health	5		5
SHS 1.2	61	Human Physiology	5		5
SHS 1.3	62	Basic Nutrition	5		5
SHS 1.4	63	Epidemiology and Demography	5		5
SHS 1.5	65	Biostatistics		5	5
Semester II (25Credits)					
SHS 2.1	68	Infectious diseases: Prevention and Control	5		5
SHS 2.2	69	Immunology	5		5
SHS 2.3	70	Health Planning and National Disease Control Programmes	5		5
SHS 2.4	71	Laboratory Methods in Health Sciences I		5	5
SHS 2.5	71	Survey Methods		5	5
Semester III (31 Credits)					
SHS 3.1	74	Non-communicable diseases: Prevention and Control	5		5
SHS 3.2	75	Human Genetics	5		5
SHS 3.3	76	Laboratory Methods in Health Sciences II		5	5
SHS 3.4	76	Project I		5	5
SHS 3.5	77	Gene and Cell Manipulation	5		5
MPH 3.2	37	Health of women, children and elderly	6		6
Semester IV (35 Credits)					
SHS 4.1	79	Review and Scientific Paper writing		5	5
SHS 4.2	80	Genetic basis of diseases	5		5
SHS 4.3	76	Project II		5	5
SHS 4.4	81	Genomics of Infectious Agents	5		5
SHS 4.5	82	Health and Environment	5		5
SHS 4.6	83	Laboratory Methods in Health Sciences III		5	5
SHS 4.7	84	Introduction to Pharmacology and Toxicology	5		5
Optional Courses: Any course from MPH including:					
MPH 4.7	49	Human Development and Health	5		5
MPH 4.8	50	Plural systems of medicine	5		5
MPH 4.9	51	Indian Society	5		5

SEMESTER I

SHS. 1.1 Introduction to Public Health

Total Credits: 5

Objectives of the Course:

- a) To give an overview of the determinants and measure of health
- b) Status of health and disease in the world
- c) To orient and sensitize students with other courses in this curriculum

Course:

- 1) Definition of the health and disease. Evolution of the concept of public health.
- 2) Determinants of health:
 - a) Genetic factors
 - b) Life styles – health behaviour
 - c) Socio- economic conditions
 - d) Nutrition and diet
 - e) Environment and sanitation
 - f) Health care delivery systems
 - g) Inter-sectoral development
- 3) Indicators of health and disease: { Measurement of health and disease }
 - a) Mortality infant and maternal
 - b) Morbidity including chronic morbidity
 - c) Quality of life indicators
 - d) Growth and development {including nutrition}
 - e) Environment and pollution
 - f) Socio-economic development indicators
 - g) Health care delivery and it's utilization
- 4) Primary Health Care approach, Health For All, indicators of HFA.
- 5) Planning for health care and disease control. Profile of health in India and Maharashtra.
- 6) Methods to collect data on health, health behavior and disease at micro and macro levels.

References :

1. Maxcy-Rosenau-Last Public Health and Preventive Medicine Ed. Robert B Wallace McGraw Hill Medical Publishing Division 1998
2. World Health Organization Technical series 1-4, WHO, Geneva.
3. Basic Preventive and Social Medicine, N.S. Deodhar, J.K. Adranvala, G.y. Rane, Pune, 1971.
4. Preventive and Social Medicine, Mahajan and Gupta
5. Textbook of Preventive and Social Medicine, J.E.Park and Park, M/s Banarsidas Bhanot, Jabalpur, 1994.

6. Biology of Disease, . Phillips and P. Murray, Blackwell Science ltd., London, 1995.
7. National Family Health Survey, International Institute for Population sciences, Bombay, 1992.
8. Epidemiology and Management for Health Care for All – P.V. Sathe and A,V.Sathe, Popular Prakashan Pvt. Ltd., Mumbai, 1997.

SHS. 1.2 Human Physiology

Total Credits: 5

Objective of the Course:

- a) Comprehension of the structure of the human body, with special emphasis on functioning of the body in terms of organ, tissue, cellular and molecular aspects.

Course:

- 1) Definition of anatomy, physiology. General anatomy of human body.
- 2) Cells, tissues, organs and system. Homeostasis
- 3) Structure and function of organs and systems:
 - Locomotive system.
 - Digestive system.
 - Circulatory system
 - Respiratory system
 - Reproductive and excretory system.
 - Nervous system.
 - Endocrine system
- 4) Blood, blood coagulation, overview of leukocyte function.
- 5) Fertilization and intrauterine development.
- 6) Human life cycle : growth and development, sexuality and conception, growth and development in infancy and childhood, adolescence, adulthood, aging, death.

References:

1. Textbook of Medical Physiology: A. C. Guyton, Prism Books Pvt. Ltd., Bangalore, 1991
2. Anatomy and Physiology for Nurses : R.S. Winwood, J.L. Smith, Education Academic and Medicinal Publishing Division of Hodder and Stoughton, London, 1985
3. Atlas of Anatomy : Casey Horton, Marshall Cavendish Books, London, 1994.
4. Basic Clinical Physiology : J.H. Green , Oxford University press, Delhi 1994.
5. Samson Wright's Applied physiology : Keele, Neil, *et.al.* (Ed) Oxford University press, Delhi, 1991.
6. Concise medical physiology : Sujit Chaudhari, New central book, Calcutta, 1996.

SHS. 1.3 Basic Nutrition

Total Credits: 5

Objectives of the Course:

- a) Understand the role of nutrients in the body.
- b) The interrelationship between nutrition and health.

Course:

- 1) Introduction: the relationship between nutrition and health.
- 2) Proximate principles:
Carbohydrates : Sources, functions, requirements, deficiency;
Proteins : Sources, essential amino acids, quality of proteins, functions, requirements, deficiency.
Lipids : sources, functions, essential fatty acids, saturated, unsaturated fatty acids requirements, deficiency.
- 3) Digestion absorption, metabolism of carbohydrates : Glycolysis, TCA, HMS, PPP, Proteins : transamination, deamination, Urea cycle, creatinine, Lipids : Beta oxidation, triglycerides, phospholipids
- 4) Energy – Unit, determination of energy content of food, Energy requirement of body factors affecting energy requirement, carbohydrate, fat & protein as sources of energy, deficiency, excess of energy.
- 5) Water as a nutrient, functions, requirement, sources, deficiency. Water and Electrolyte Balance.
- 6) Minerals, their role in human nutrition, calcium, phosphorous, sodium, potassium, magnesium.
- 7) Recommended dietary allowances, basis of their formulation, used and limitations, Balanced diet, use of five food groups, estimating adequacy of diet, Diet modifications in diseases of GIT, Liver, Endocrine, Cardiovascular.
- 8) Nutritive disorders, protein Energy Malnutrition, poverty and nutrition

References :

- 10) Advanced textbook on food and Nutrition : Dr. M Swaminathan,, The Bangalore Publishing Co. Ltd. Bangalore, 1974
- 11) Recent Trends in Nutrition : C Gopalan ,Oxford University Press, New York 1993.
- 12) Nutrition for Developing Countries : E. Savage King , Oxford University Press, Oxford, 1992.
- 13) Nutrition problems and Programmes in South East Asia : Dr. C. Gopalan, World Health Organization, New Delhi, 1987.
- 14) Perspective in Nutrition : Gordon M. Wardlaw, Paul M. Injel, Time/Mosby College Publishing, St. Louis, 1990.
- 15) Fundamentals of food and Nutrition : Sumati R. Mudambi, M.V. Rajagopal, V.R. Damodharn, Wiley Eastern Ltd. New Delhi, 1982.
- 16) Clinical Dietetics and Nutrition, F.P. Antia, Oxford University Press, Delhi, 1993.
- 17) Human Nutrition and Dietetics, J.S. Garrods & W.P.T. James, Churchill Livingstone, London, 1993.

SHS 1.4 Epidemiology and Demography

Total Credits: 5

Objectives of the Course:

To orient students in a) Concepts in epidemiology b) epidemiology of infectious diseases c) risk measurement and d) analytical epidemiology e) To orient students about the basic concepts in and measures of demography. f) To sensitize students about the appropriate use/application of various demographic measures relevant in the field of health sciences.

Section 1 Epidemiology : 3 credits

- 1) Historical aspects of epidemiology , Evolution, scope and uses of epidemiology
- 2) Epidemiologic orientation to health and disease, Selected Epidemiologic Concepts in disease, Descriptive epidemiology
- 3) Epidemiologic aspects of infectious disease, Natural history of disease, Survival analysis, Epidemiological principles in prevention and control disease.
- 4) Evaluation of diagnostic and screening tests, Validity (sensitivity, specificity), Predictive value, Reliability.
- 5) Study designs in epidemiology, Prospective and retrospective studies, Case control studies and Cross-sectional studies, Cohort studies and cohort analysis, Sampling and Sample size estimation Experimental studies, Randomized controlled trials : Prophylactic and therapeutic, community trials.
- 6) Risk measurement, Measurement of morbidity and mortality : Incidence, Prevalence, Age-adjustment and survival analysis, use of morbidity and mortality indices in epidemiological studied.
- 7) Analytical epidemiologic : Tools of epidemiological investigation. Strategy of epidemiological investigation : Causal association, problems and issues in epidemiological investigation,
- 8) Field applications of epidemiological methods, Investigation of an outbreak of infectious disease, Evaluation of screening programs, Genetic contribution in disease causation.

References :

1. Basic Epidemiology : Beaglehole. R. Bonita, et. al., WHO Publication, Geneva, 1993.
2. Foundations of Epidemiology : David E., et. al. Oxford University Press, New York, 1984.
3. Practical Epidemiology : Barkar, D.J.P., Churchill pub, Livingstone, 1982.
4. Epidemiology and Management for health Care : Sathe , P.V. Sathe, A.P., Popular Prakashan, Mumbai, 1991.
5. Molecular Epidemiology : Paul Schulte, Perea, F., Academic Press, California., USA, 1993.
6. Measurement of levels of Health : Holland, W.W., et. al., WHO Regional office for Europe, Copenhagen, 1979.
7. Epidemiology in health care planning : E.A. Knox (ed), Oxford University Press, New York, 1979.

Section 2 - Demography: 2 credits

- 1) Introduction: Definitions, difference and similarities between Demography and Population Sciences. Scope and nature, importance of the study. Historical review
- 2) Methods of Demographic Data Collection: Primary and Secondary sources of data collection. Procedures, Uses, Strengths and weakness of census, vital statistics, sample survey, dual reporting system - SRS
- 3) Population composition: Sex composition, factors affecting sex composition, Age structure Population pyramids, impact of various demographic processes on the age structure. Comparison – developed and developing countries
- 4) Demographic transition
- 5) Fertility: Determinants: Social economic, political, natural fertility levels and trends in India and world, Measures of fertility, Impact of level of fertility on reproductive health, selected theories of fertility, policies about fertility control.
- 6) Mortality: Measures of mortality, Causes of Death: epidemiological perspective, Infant mortality rates, maternal mortality, Trends of Mortality in India, differentials in mortality in developed and developing countries.
- 7) Migration and urbanization: General terms and concepts, internal migration, measures of migration, Differential migration, International migration, Migration in India. Implications of migration and urbanization on health and health related development policies (water, sanitation, etc).
- 8) Population Growth and Problems: Population growth, reasons for sudden growth in population, problems emerging out of that. Rural-urban distribution of growth pattern, population growth and related problems.
- 9) Population Policy: Health planning in terms of Family planning, Health services, Vital processes. Policies and programmes influencing demographic processes in the context in India's population.

References:

1. Principles of population Studies : Asha Bhende and Tara Kanitkar, Himalaya Pub, Houses, Mumbai, 1996
2. Population: John Weeks, Wordsworth pub., California, USA, 1994.
3. Population Transition In India: S.N.Singh, M.K.Premi, P.S.Bhatia, B.R.Publishing Corporation, Delhi, 1989.
4. Population in the context of India's development: P.B. Desai UGC – UNFPA project, Ahmedabad, 1987.
5. Demography: Peter Cox, Cambridge University Press, U.K., 1989.
6. Techniques of Demographic Analysis: K.B. Pathak, F. Ram, Himalaya Publishing Houses, Mumbai, 1992.
7. Health Monitor: Foundation for Research in Health S, Mumbai, 1990.
8. National Family Health Survey – 1, 2 and 3: International Institute for Population Sciences, Mumbai.
9. Basic Demographic Techniques and Applications – K. Srinivasan, Sage Publications, 1998
10. World Population Prospects, United Nations Population division, Department of Economic and Social Affairs

SHS 1.5 Biostatistics

Total Credits: 5

Course Objectives:

Collection and analysis of morbidity data from selected urban area.

- a) Introduction to bio-statistics through analysis of field data (collected and compiled by students of SHS).
- b) Training in usage of appropriated statistical software (SPSS)
 1. Introduction and Revision of Basic statistics: Definition, Type of data, Scales of measurement, Source of data, Presentation of data, measure of central tendency, Measure of variability, Skewness, Kurtosis
 2. Probability and Normal Distribution: Classical probability, rules, Basic elements of probability, Combinations, Permutation, Conditional theory and experimental probability, Normal Distribution, applications of Normal Distribution
 3. Sampling methods, Sampling distribution, determination of sample size, Confidence Intervals for mean(s) and proportion(s), sampling error.
 4. Test of Significance: Logic of test of significance – type of errors, p-values etc. test of significance for mean (s) , proportion (s)
 5. Nonparametric test : Overview of tests, Chi-square test, Fisher’s Exact probability test, Sign, Mann-Whitney test, Rank correlation
 6. Association and Causation: Defining variables, measurement, type of association.
 7. Correlation and Regression: concept, correlation coefficient, simple linear regression, test of significance, nonparametric and multiple correlation
 8. Analysis of Variance: ANOVA, Multi-way ANOVA,
 9. Multiple regressions, Logistic regression, Introduction to principle component analysis, Discriminant analysis, Factor Analysis, Cluster Analysis.

References:

1. An Introduction to Biostatistics: A manual for students in Health Sciences :P.S.S. Sundar Rao, J.Richard Prentic Hall , New Delhi, 1996.
- 2.Bio-Statistics : A foundation for Analysis in the Health Sciences : Daniel, W.W., John Wiley and Sons Pub., Canada, 1991.
- 3.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.

4. Bio-Statistics perspective in Health care research and practice : Verma, B.L., Shukla, G.D., et., al , C.B.S. Pub. New Delhi 1993.
5. Handbook of Statistics : Krishnaian, P.K. Rao, C.R. (ed), Elsevier SciencePub. Netherlands, 1988.

SEMESTER II

SHS 2.1 Infectious Diseases: Prevention & Control

Total Credits: 5

Objectives of the Course:

To understand the biology of communicable diseases, with specific reference to the Prevention, Control, Mechanism of pathogenesis and manifestation of clinical signs and symptoms.

Course:

- 1) General overview of infectious diseases, impact of infectious diseases on developing countries. Characteristics of prokaryotes and eukaryotes, Structure and function of typical bacterial cell.
- 2) Virulence factors, mode of action of toxins, cellular basis of disease
- 3) Microbial subversion of host defense mechanisms
- 4) Anti-microbial agents, mode of action, genetic basis of drug resistance, multi-drug resistance
- 5) Biology of viruses, classification, and mechanism of pathogenesis
- 6) Anti-viral agents
- 7) Biology, pathogenesis and pathology, clinical presentation, of common infections
- 8) a. Respiratory : Tuberculosis, leprosy, ARI's including pneumonia, measles, mumps , rubella
b. Intestinal : Diarrhoea, typhoid, polio, hepatitis, worm infestations
c. Contact : STDs and AIDS
d. Vector borne : Plague, rabies, malaria and filaria, JE, dengue
- 9) Disease prevention and control
- 10) Malnutrition and infection

References:

1. World Health Organization : Report on infectious diseases, and Report on Multidrug resistance , World Health Organization, Geneva
2. Principles and Practice of Medicine : Davidson, Edward, Bouchier et. Al., Pearson Professional Ltd. London, 1995
3. Biology of Disease : Jonathan Phillips, Paul Murray, Blackwell Science Ltd. Australia, 1995
4. Practical Medical Microbiology : Mackie and M.C. Cartney, Longman Group, U.K. 1995
5. Human Virology : A textbook of Students of Medicine and Microbiology, Dentistry, Leslie Collier, John Oxford, Oxford University Press, Tokyo, 1993
6. Textbook of Medicine : Cecil, Bennett, et al., Harcourt Brace Jovanovich Inc. U.S.A. 1992
7. Medical microbiology: Greenwood et al., Churchill Livingstone Longman group, London, 1992
8. Textbook of Medical Parasitology : Jayram Paniker, Jaypee Brothers, New Delhi, 1993

SHS 2.2 Immunology

Total Credits: 5

Objectives of the Course:- To study

a) Principles of immunology b) Vaccines, immunization program, evaluation c) developments in the field of vaccines against common infections d) impact of technological developments on health development

1. Immunology, introduction and scope.
2. The organs and the cells of the immune system
3. Constitutive defenses of the body, induced defenses of the body.
4. B cell responses, maturation, activation, differentiation, immunoglobulins, antigen processing and presentation.
5. T cell response, cytokines, complement system.
6. Inflammation, hypersensitivity, autoimmune reactions.
7. Serology, Introduction and classification, Agglutination, precipitation reactions, complement fixation test.
8. Immuno-flourescence, radioimmunoassay, Elisa and Immunoblotting
9. Tumor immunology
10. Acquired immune deficiency syndrome

Application

1. Vaccines : Active and passive immunization, types, supply and quality, History of vaccination : invention era, early program on eradication, EPI, disease control era.
2. Global Program on Vaccination, Vaccine Research and Development Program,
3. Global immunization polices, schedules, transport and storage, cold chain, Surveillance of immunization programs, process/impact indicators.
4. Immuno-diagnostics and therapeutics.

References:

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 references therein from the WHO website
6. WHO Technical Publications: Vaccines, Human Genetics Program series.

SHS 2.3 Health Planning and National Disease Control Programs

Total credits: 5 credits

Total Units: 2

Objectives of the Course:

1. To understand the basic principles of health planning from the perspective of national development in health sector.
2. To orient students about the national disease control programmes.

Course: Unit I: Health Planning (Credits 2)

- 1) History of Planning in India
- 2) Development of National Health Policy
- 3) Concept of Planning, Health Planning Models
- 4) Health Administration
- 5) Role of Health Planning in Primary Health Care
- 6) Role of NGOs in health planning and development
- 7) Micro and Macro level planning

Course : Unit II National Disease Control Program (Credits 3)

- 8) National disease control programmes: Malaria, Tuberculosis, AIDS, Diarrheal disease, Leprosy, etc.
- 9) Critical evaluation of various disease control programmes.
- 10) Role of Health Education and Counseling
- 11) Community Participation

References:

1. National Health and Research Policy Documents
2. Expert Committee Report on Public Health Systems in India 1996
3. Government Publications on NDCPs.

SHS 2.4 Laboratory Methods In Health Sciences I

Total Credits: 5

Objectives of Course:

- a) To provide practical aspects to theoretical component
- b) To provide training in basic laboratory exercises : hematology, serology, biochemistry, microbiology

Course :

- 1) Introduction to common laboratory equipment, preparation of buffers reagents
- 2) Body markers: Chemistry of carbohydrates, proteins, lipids: urine glucose estimation, determination of blood glucose, glycosylated hemoglobin, determination of serum proteins, liver function tests – serum bilirubin, SGPT, SGOT, alkaline phosphatase; lipid profile test ---- serum total cholesterol, serum HDL triglycerides, Hematology.
- 3) Growth and culture of bacteria : Sterilization, preparation of media , staining methods – Grams, capsule, acid fast staining, antimicrobial susceptibility testing,
- 4) Phage titration methods
- 5) Water testing for microbial contaminants.
- 6) Serological tests: VDRL, Widal, ASO, RA test, C-reactive protein test.
- 7) Preparation of thick and thin film, identification of malarial parasites and species.
- 8) Basic immunological methods: Precipitin, ODD, ELISA and Western blotting

References :

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.

SHS 2.5 Survey Methods

Total Credits: 5

Objectives of the Course:

To develop skills in epidemiological methods

To train students in techniques of primary data collection

Plan and execute a community based study
Research report writing

Course:

- 1) Introduction to research methods, identifying a problem, conceptualizing the problem.
- 2) The epidemiological framework for study, Brief overview of study designs : case control and cross-sectional studies, cohort studies, experimental study designs
- 3) Field visits: Sources of data
- 4) Practical exercises in sampling and sample size estimation
- 5) Methods of data collection, measures of morbidity, mortality, incidence, prevalence, risk measurements
- 6) Data analysis and presentation
- 7) Introduction to Epi-Info

Reference:

1. Basic Epidemiology, Beaglehole et al. WHO Publication, Geneva 1993.
2. Epi-Info Manual
3. Bio-Statistics : A foundation for Analysis in the Health Sciences : Daniel, W.W., John Wiley and Sons Pub., Canada, 1991.
4. 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.
5. Bio-Statistics perspective in Health care research and practice : Verma, B.L., Shukla, G.D., et., al , C.B.S. Pub. New Delhi 1993.

SEMESTER III

SHS 3.1 Non-Communicable Diseases: Prevention and Control

Total credits: 5

Objectives of the Course:

a) To give global to local overview of NCDs including: Cancer, Diabetes, Arthritis, Cardiovascular, Asthma, along with psychological disorders and addictions. Epidemiology, risk factors, prevention, control,

Course:

- 1) Overview and introduction to NCDs, Global picture: (2)
- 2) Epidemiology of NCDs, risk factors, prevention and management: general strategies (6)
- 3) New approaches and policies of NCDs. (4)
- 4) NCDs programs of WHO, PAHO, and Government of India. (2)
- 5) Role of Voluntary organizations, self-help groups (2)
- 6) Some important NCDs: Following diseases will be covered for Etiology, Pathophysiology, Epidemiology, Prevention and Control. .
 - a. Asthma (2)
 - b. Cancer (8)
 - c. Cardiovascular diseases (8)
 - d. Chronic rheumatic diseases (6)
 - e. Diabetes (8)
 - f. Tobacco use (2)
- 7) Mental Health: New understanding and new Hope (10)
- 8) Seminars (15)

References:

Appropriate textbooks and research papers
World Health Reports Archives: 1995-2001

SHS 3.2 Human Genetics

Total credits : 5 credits

Course Objectives:

- a) To present the fundamentals of human genetics with specific reference to health and disease
- b) Methods in studying human inheritance
- c) Overview of the mechanism of disease

Course: 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.

Course: 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 : presentations
5. Diseases with a genetic predisposition
6. Genetic testing and ethical issues

References:

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

SHS 3.3 Laboratory Methods in Health Sciences II

Course objectives:

The set of laboratory exercises take the student through the basic techniques of molecular biology

Course:

1. Isolation of plasmid and genomic DNA
2. Agarose gel electrophoresis
3. Restriction digestion of DNA
4. Ligation
5. Transformation and analysis of transformants
6. Polymerase Chain Reaction
7. Isolation of proteins
8. SDS-PAGE
9. Western blotting

References:

1. Current Protocols in Molecular Biology, John Wiley and Sons, Inc 2007.
2. Molecular cloning, Sambrook and Maniatis, 2nd edition, CSHL Press, 1995

SHS 3.5 Project I

Total Credits: 5

AND

SHS 4.3 Project II

Total Credits: 5

The objective of this course is to generate capacity to independently design and execute a simple study. Curriculum takes students through selections of topic, formulation of aims and objective, selection of tools and techniques, data collection, analysis and report writing. Conducted over two semesters.

SHS 3.5 Gene and Cell Manipulation

Total Credits: 5

Course Objectives:

- a) To understand the role of recombinant DNA technology in prevention, health promotion and therapeutics
- b) Technique for production of pharmaceuticals, vaccines, gene therapy

Unit I: Basic techniques

- a. Electrophoresis, PCR, nucleic acid blotting techniques, Sequencing, transformation/transfection, use of restriction enzymes and ligases
- b. Techniques for studying gene expression: Hybridization techniques (Northern hybridization, in situ hybridization, DNA microarrays), PCR (RT PCR, Real time PCR), in vitro mutagenesis.
- c. Cloning of genes: vectors used for cloning and expression, strategies for cloning genomic DNA, screening strategies, strategies for cloning RNA, and production of gene libraries.
- d. Transgenic technology
- e. Techniques for recombinant pharmaceuticals and vaccines, genetically engineered antibodies and expression cloning.
- f. Gene therapy and DNA vaccines.
- g. Pharmacogenomics.
- h. Stem cells and cell engineering: production of adult and embryonic stem cells, different stem cell engineering techniques. Use of stem cells in cloning, in cases of tissue rejection, and their use in therapeutics, ethical considerations
- i. Cell culture : Principles of sterile techniques and cell propagation, methods for scaling up cultures, Defined media, role and constituents of serum, selection of medium, Cell separation methods.Organ culture, processing tissues for histology. Cytotoxicity and viability assay

References:

- 1.Principles of gene manipulations, Old and primrose, Blackwell scientific publications, 4th edition, 2002.
 - 2.Genome analysis and Genomics, 3rd edition, Primrose, Blackwell Publishing Limited; 3 edition 2002
 3. Human Molecular Genetics, Strachen and Read, 2nd edition, BIOS Scientific Publishers,1999
 4. Genes VII, Lewin, Oxford University Press, USA 1999
 5. Molecular cloning, Sam brook and Maniatis, CSHL Press, 1995
- WHO Technical Publications: Vaccines, Human Genetics Program series.

SEMESTER IV

SHS 4.1 Review and scientific paper writing

Credits : 5

Course objectives :

- To impart training in the methodology of writing a review
- developing a research proposal
- background knowledge on funding agencies and their submission requirements

Course:

1. Submission of a review pertaining to public health applications of molecular technologies
2. Development of a research proposal (public health or epidemiology, including various diagnostics). Protocol to include ethical guidelines and other regulations.

Reference:

1. Communicating in Science: Writing a Scientific Paper Cambridge University Press; 2 edition, 1993
2. Writing and Presenting Scientific Papers, Nottingham University Press (Sep 1 2000)

SHS 4.2 Genetic basis of diseases

Course Objectives:

- a) Genes as non-modifiable risk factors for disease
- b) Strategies for identifying disease genes
- c) Complex traits and environmental factors
- d) Implications of testing and ethics

Techniques:

1. Principles and strategies in identifying disease genes
2. Mutations and polymorphisms, physical and genetic mapping, human genome project
3. Complex diseases, various methods including role of family, twin and adoption studies.
4. Role of biotechnology in disease therapeutics, diagnostics, prevention and control
 - a) Diagnostics : overview, limitations, molecular diagnostics
 - b) Vaccines : example HIV and malaria vaccines
 - c) DNA vaccines
 - d) Transgenic animals and development of pharmaceuticals
 - e) Genetically modified plants
 - f) Gene therapy
 - g) Applications of DNA fingerprinting

Reference:

1. Medical genetics, Prichard and Kroff, 3rd edition, Mosby; 2005
2. Molecular Cell Biology, Lodish et al, W. H. Freeman; 5 edition, 2003
3. Human Molecular Genetics, Strachen and Read, 2nd edition, BIOS Scientific Publishers,1999
4. Genes VII, Lewin, Oxford University Press, USA 1999
5. Emery's Elements of Medical Genetics, Turnpenny et al, Churchill Livingstone 2004
6. WHO Technical Publications: Vaccines, Human Genetics Program series.

SHS 4.4 Genomics of Infectious Agents

Total Credits: 5

Objectives of the Course:

- a) To teach the molecular basis of pathogenesis with specific reference to its application in prevention and control
- b) To expose students to the recent advances in information on microbial genomes

Course:

- 1) Overview of microbial pathogenic mechanisms
- 2) Methods of studying pathogenic genomes
- 3) Microbial genome databases
- 4) Pathogenic genomes : structure, function and regulation
M. tuberculosis,
BCG,
V. cholerae,
H.pylori,
Treponema pallidum
H.influenzae
HIV,
measles,
Polio
P. falciparum
- 5) Genomic analysis of virulence : comparative genomics, expression analysis, transposon mapping, computational genomics
- 6) Molecular epidemiology : specific case studies
- 7) Vaccine development and status of recent vaccine trials

References :

1. Genome Analysis and Genomics, 3rd edition, Primrose, Blackwell Publishing Limited; 3 edition 2002
2. Genomes 2, Brown, Garland Science; Second edition, 2002
3. Microbial genome databases and references therein.

SHS4.5 Health and Environment

Total credits : 5

Objective of the Course :

To sensitize students about the natural ecosystem, sources of pollution, and health hazards of disturbed ecosystem.

Course :

- 1) Ecosystem: Types, Bio-geo-chemical systems : H₂O, N, C, Food chains and webs, Biomagnification, Interactions within physical, biological and social environments.
- 2) Natural resources: distribution, utilization, exhaustion, impact on ecosystem, Urban scenario : Human settlements, housing, poverty and migration, population growth. Rural scenario : deforestation, afforestation, groundwater levels.
- 3) Pollution : concept, effect on health. Air pollution : gaseous, particulate, vehicular, industrial, effect of aeropollutants on health, Control of air pollution: role of agencies : CPCB, MPCB, NAAQS.
- 4) Water : Sources uses, chemical, biological pollutants, drinking water quality, drinking water treatment, study of the drinking water supply of Pune city, heavy metal contamination, effects on health, aquatic life, irrigation, Sanitation, solid wastes, liquid waste disposal; physicochemical, biological parameters; waste water treatment.
- 5) Noise : frequency, intensity, environmental noise, vehicular, industrial, auditory effects, non-auditory effects, audiometry.
- 6) Industries : types, toxic and hazardous wastes, ISO norms, energy, fossil fuels, nuclear.
- 7) Occupational health : Types and associated hazards, Agrochemicals, residual impact.
- 8) Global issues : Ozone depletion, green houses gases, global warming, Ocean pollution, Biodiversity : terrestrial, aquatic, International initiatives : Rio Conference, Agenda 21, WHO healthy cities project, PEC.

References:

1. Our plants our health : World Health Organization, Geneva, 1992.
2. The ecology of health : J. Chesworth, Sage Pub., London, 1996.
3. Encyclopedia of Environmental pollution & control : Trivedi Enviro media pub., Karad, 1995.
4. World resources : Oxford university press, Delhi 1994.
5. The human impact on natural environment : Andrew Goudie, Basil Blackwell ltd., U.K., 1990.
6. Industrial ecology and global change : Socolow *et. al* (ed), Cambridge University press, U.K., 1994.
7. Agricultural growth, rural poverty and environmental degradation in India , C.H. Hanumantharao, Oxford university press, Delhi, 1994.
8. Microbial aspects of pollution control : Dart *et. al.*, Surabhi Publication, Jaipur, 1994.
9. Air Pollution : B.K. Sharma, Kaur, H., Goel Pub.House, Meerut, 1993.
10. Health hazards from new environmental pollutants : WHO, Geneva, 1976.

SHS4.6 Laboratory Methods in Health Sciences III

Course Objectives:

- a) To provide practical skills in human genetics
- b) To provide essential information on Universal Safety Practices

Course:

- a) Essential aspects of biosafety, Universal Safety Practices and guidelines for recombinant DNA work.
- c) Method of collecting pedigree data and pedigree analysis, risk assessment
- d) Isolation of human DNA
- e) Demonstration of Mendelian principles using animal models, human pedigrees and DNA markers
- c) Karyotyping

References:

1. Current Protocols in Molecular Biology, John Wiley and Sons, Inc 2007.
2. Molecular cloning, Sambrook and Maniatis, 2nd edition, CSHL Press, 1995

SHS4.7 Introduction to Pharmacology and Toxicology

Credits : 5

Course objectives :

To introduce students to the basic concepts of pharmacology and toxicology

1. Pharmacology:

1. Introduction to pharmacology: drug development and Drugs and their sources

2. Definitions:

Bioavailability, bioequivalence therapeutic index, potency, efficacy, risk benefit ratio, selective toxicity, plasma half-life, dose response curve, area under curve, volume of distribution.

3. Drugs Delivery System: Routes of Drug Administration:

4. Pharmacokinetics

Drug solubility and passage of drugs across body membranes, plasma concentration of drugs and various factors affecting it. Factors affecting absorption, distribution, biotransformation and excretion (ADME).

5. Pharmacodynamics:

Drug receptors and theories, mechanism of drug action, specificity of drug action, and factors modifying the action.

2. Toxicology:

- Toxicity studies for drugs: invivo studies and invitro studies.
- Mechanism of toxins: Hypersensitivity reactions.
- Toxicokinetics (fate of toxicants in the body)
- Chemical carcinogens and teratogens
- Treatment of intoxication.

References:

1. Pharmacological basis of Therapeutics, Goodman and Gilman, 10th ed, McGraw Hill, 2000.
2. Basic & Clinical Pharmacology & Toxicology, Blackwell Publishing, 2006
3. Pharmacology, Rang and Dale, Churchill Livingstone, 1999
4. Annual Reviews of Pharmacology and Toxicology

Proposed Syllabus

**Integrated M.Sc.-Ph.D in
Nutrition Sciences**



**Interdisciplinary School of Health Sciences
University of Pune
Pune 411007
020-25691758**

Background: Nutritional Sciences

The impact of improper nutrition on human health is well documented. India faces the double burden of rampant undernutrition, and the emerging epidemic of non-communicable diseases, precipitated by dietary, lifestyle and genetic factors. Surveys show that undernutrition is widely prevalent in the country, exacting a heavy toll on vulnerable groups like women, children and the disadvantaged strata of society. Other studies have documented epidemiological transition revealing the iceberg of non-communicable diseases. These diseases/disorders will pose a major challenge to the public health system in the form of increased health care costs and the need to evolve systems and strategies for treating chronic conditions. Human dietary interventions are one of the most cost-effective of all public health interventions. Nutrition interventions in communities have been effectively used, especially for improving maternal and child health outcomes. Dietary interventions remain a major component for population at risk of non-communicable diseases.

The Interdisciplinary School of Health Sciences offers a specialised Community Nutrition course (page 15) as part of the MPH. The focus of the Nutrition Sciences course is on basic research in public health nutrition with a specialisation in three areas of public health importance, *viz.*, (Cardiovascular Diseases, Diabetes and Maternal and Fetal Interactions). The course is being offered as an integrated MSc-PhD programme in Nutritional Sciences and is designed in anticipation of a funding support from the Department of Biotechnology, Government of India.

Goal of the Nutritional Science programme

- The goal of the Nutritional Science programme will be to generate academic researchers with an understanding of the needs in the field of public health nutrition in the country and skills in basic research in Nutritional Sciences.

Objectives of the Nutrition Sciences programme

- To emphasize the role of nutrition as a major modifiable factor in community health and the preventive, promotive and curative role of diet in health
- To train researchers who have:
 - knowledge and skills of community diagnosis of nutritional status through nutritional assessment methods who can design, evaluate and monitor strategies to enhance population health, who can identify researchable areas in the field of population

nutrition, conduct research, publish peer-reviewed data, and utilize these results to influence policy decisions

- To train researchers who can undertake basic and applied research in the field of nutritional sciences and use such data to understand the etiology and pathology of disease, forecast population at risk and advise population based prevention strategies

Skills and Competencies to be imparted

- Research in nutrition sciences
- Teaching skills

Eligibility

Graduate in Life Sciences, biochemistry, microbiology, nutrition dietetics, food sciences, any branch of medicine, B.Pharm, of any statutory University or recognized as equivalent there to by the University of Pune, with at least 65% marks.

Courses

Courses are listed below. The courses are categorized into General Courses (Course Tiles preceded by MNS, MPH and SHS) and Directed Studies (DS). DS Courses are those that are specifically designed to nurture PhD studies in the three research areas defined in this programme.

Integrated M.Sc.-Ph.D. Programme

The integrated MSc-PhD program in Nutritional Sciences offers opportunities for advanced study and original investigations in basic and applied human nutrition at both the masters and doctoral levels. The curriculum includes course work and thesis research through practical work in three specific areas (Cardiovascular Diseases, Diabetes and Maternal and Fetal Interactions micronutrient deficiency disorder). Course work involves subjects relevant to these areas as well as other areas in human nutrition, including

nutrient metabolism, diet and disease, nutrition through the life cycle and gene diet interaction. Course work includes extensive laboratory works.

Students interested in this program will be invited to apply through a national level advertisement. Selection will be through University of Pune Common Entrance Test. Students admitted to this program will be enrolled for an MSc-PhD integrated degree in Nutritional Sciences. There will be opportunity for interim exit. These students will be awarded an MSc Nutritional Sciences degree. Continuation for PhD will be based on continuous evaluation of the student based on their performance in course work and in the directed studies courses. Students continuing for PhD can initiate formal PhD registration procedure of the University of Pune after two years of joining the course. Integrated MSc-PhD degree will be awarded after a minimum of one year of work after PhD registration. Thesis should be submitted within four years of registration.

Time line for Integrated Ph.D. Programme

- 1 The degree being offered at the end of study period is “ Integrated MSc-PhD in Nutritional Sciences”.
- 2 Continuations for PhD will be decided by the Doctorial Committee. It will depend on performance based on continues evaluation in general course work and directed studies courses.
- 3 Interim exit is available for students not qualifying for continuation for PhD. These students will be awarded an MSc Nutritional Sciences degree. Such students must complete 100 credits within 2 years in order to obtain the master degree.
- 4 Timeline for integrated PhD is shown below. The fist two years will involve formal studies, which will be organized in to two teaching semesters per year each. Each semester consist of 15 weeks of teaching. One credit is equivalent to 15 hours of teaching.
- 5 There is one hour of assessment for every four hours of teaching. Assessment may be in the form of evaluation of long/short written answers, multiple choice questions presentations, term papers, assignments etc. 50% of assessment is done during the term so that there is continues evaluation of the students. 50% assessment is done at the term end examination(held around May and November respectively)
- 6 Time line for Integrated PhD Program.

First Year	Period	General course Work	Directed Studies (DS) and evaluation methods
	Semester I	25 credits	1. Rotation with collaborating groups Focus: Understanding broad research areas 2. DS Course I: Research Methods I: Overview of Research Methods, how to conduct a literature review. 3. Assessment of literature review.
	Sem I end		4. Semester I exam 5. Establishment of doctoral committee
Second Year	Semester II	25 credits	6. Rotation with collaborating groups Focus: Methods and techniques 7. DS Course II Research Methods II: Methods and Techniques 8. Assessment of submission on Methods and Techniques
	Sem II end		9. Semester II exam 10. Doctoral Committee evaluation of performance after 1 year of study, student counseling and placement of student for dissertation
Second Year	Semester III	25 credits	11. DS III Dissertation 12. Assessment: Project Defence (including detailed Literature Review, Justification of Topic, Objectives and Proposed Methodology) 13. Semester III exam
	Sem IV	25 credits	14. DS IV: Dissertation: Presentation of findings and final defence. 15. Semester IV exam
	Sem IV end		16. Result of continuous evaluation 17. Interin exit for 3 students who do not qualify for PhD, award of MSc. Nutritional Sciences. 18. Final placement for students for PhD studies
Third Year onwards			19. PhD pre-registration defence. 20. Integrated MSc-PhD degree to be awarded after a minimum of 1 and a maximum of not more than 4 years.

M.Sc. Nutrition Sciences

Sr. No.	Page No.	Course Name	Credits		
			Theory	Practical	Total
		Semester I (26 Credits)			
MPH 1.1	92	Introduction to public health	2	2	4
MNS 1.1	93	Community Nutrition	1		1
MPH 1.2	95	Human Biology	4		4
MNS 1.2	95	Basic Nutrition	4		4
MNS 1.3	97	Applied Nutrition	2		2
MPH 1.4	98	Epidemiology	5		5
MPH 1.5	99	Biostatistics		5	5
DS 1.0	100	Research Methods I		5	5
		Semester II (28 Credits)			
MNS 2.1	102	Infectious diseases and nutrition	3		3
MNS 2.2	102	Nutrition and metabolism	4		4
MNS 2.3	103	Diet therapy and clinical nutrition	5		5
MNS 2.4	104	Survey Methods	1		1
MNS 2.5	104	Nutrition Assessment (Practical)		5	5
MNS 2.6	105	Nutrition Laboratory		5	5
DS 2.0	106	Research Methods II		5	5
		Semester III (29 Credits)			
MNS 3.1	108	Applied Nutrition Practical		4	4
SHS 3.2	108	Human Genetics	5		5
SHS 3.3	110	Laboratory methods in Health Sciences II	5		5
SHS 3.4	110	Genes and Cell Manipulation	3		3
DS3.1	111	Nutrition through the life cycle	2		2
DS3.2	112	Micronutrients deficiency and disorders	2		2
DS3.3	113	Non-communicable diseases: Overview	1		1
DS3.4	113	CVD	1		1
DS3.5	113	Diabetes	1		1
DS3.6	114	Dissertation I		5	5
		Semester IV (15 Credits)			
SHS 4.6	116	Laboratory methods in Health Sciences III		5	5
DS4.1	116	Scientific Reading	2		2
DS4.2	117	Proposal writing		3	3
DS4.3	117	Dissertation II	2	5	5

Semester I

MPH 1.1 Introduction to Public Health

Credits: 3

MPH 1.11 Public Health Concepts and Issues

Credits: 2

Course Objectives:

- To introduce students to the concept of public health
- To give an overview of the determinants and measures of health
- Status of health and disease: global and national

Course

- Definition and determinants of health
- Public Health: Evolution of the science of public health
- Prevention
- Determinants of Health –
 - a. Nutrition
 - b. Lifestyle
 - c. Socio – economic
 - d. Genetic
- Epidemiological Transition
- Global Health
- Functional organization of the public health and family welfare programmes
- Primary Health Care
- Millennium Development Goals
- India: Health indicators, urban-rural profile, National Rural Health Mission

MPH 1.12 Public health concepts and issues: Practical exercises

Credits : 2

Course Objective:

- To introduce students to the field of public health and its various activities
- Sources of health data
- Understanding of health disparities
- Contemporary issues in public health
- To understand socio-economic and demographic characteristics of the community and the distribution and types of disease in the community

Course:

The course will involve field study, data collection, analysis and reporting of :

1. Community perceptions on health and disease
2. Sources of health data –
 - b. Birth and Death Registries
 - c. Disease Registries
 - d. Population – based data, eg. NFHS data
3. Sources of Global Health Data
 - d. Comparison of health indicators of selected developed and developing countries
 - e. Functional organisation of the public health system –
 - a. Primary Health Centres (PHCs)
 - b. Sub – Centres (SCs)
6. Data Collection so as to provide an insight into community demographics, socio – economic status, types and distribution of diseases and disorders in the community

Suggested texts:

- 8) Class handouts
- 9) Oxford textbook of Public Health Ed. Roger Detels, James McEwen, Robert Beaglehole, and Heizo Tanaka Oxford University Press (OUP) 4th Edition: 2002.
- 10) Public Health at the Crossroads – Achievements and Prospects. Robert Beaglehole and Ruth Bonita 2nd Edition Cambridge University Press
- 11) Maxcy-Rosenau-Last Public Health & Preventive Medicine, Fourteenth Edition Ed Robert Wallace, MD, et al.
- 12) Epidemiology and Management for Health Care: Sathe , P.V. Sathe, A.P., Popular Prakashan, Mumbai, 1991.
- 13) International Public Health: Diseases, Programs, Systems, and Policies by Michael Merson, Robert E Black, Anne J Mills - Jones and Bartlett Publishers.
- 14) Preventive and Social Medicine, K Park, Bansaridas Bhanot Publishing House.

MNS 1.2 Community Nutrition
Credits : 2

Course Objective:

To provide an overview of the critical role of diet as a determinant of health, nutritional status of the Indian population, nutrition needs, food distribution system and intervention programs

Course:

- Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods.
- Epidemiology, etiology, and consequences of undernutrition, with particular focus on the nutritional problems of children and women in low income populations.
- Nutritional status of the Indian population, influencing factors
- Community based nutrition interventions, Objectives and operations of feeding programmes in the country
- Food production and distribution systems
- National nutrition policy
- Role of nutrition education

Suggested Texts:

1. Gopalan.C, 2006, Towards India's nutritional well being: Need for a second wind., NFI Bulletin, Vol 27, No:1.
2. Gopalan.C, 1996, Nutrition research in South-East Asia, The emerging agenda for future. WHO, AITBS publishers, New Delhi.
3. Seshadri Malini, Siddhu Anupa, 2003, Nutrition goals for Asia – Vision 2020, Proceedings of IX Asian Congress Of Nutrition, NFI Publishers New Delhi.
4. Srilakshmi. B: 2002, Dietetics, IVth edition, New Age International (P) Ltd.

MPH 1.2 Human Biology

Credits : 4

Course Objective:

- To provide an understanding about the structure and function of the human body

Course :

- Human life cycle
- Structure and function of organs and systems
 - Digestive
 - Respiratory
 - Excretory
 - Circulatory and lymphatic
 - Endocrine
 - Musculo-skeletal
 - Nervous
 - Reproductive

Suggested Texts:

5. Guyton Arthur C., 1991, Textbook of Medical Physiology, A Prism Book Pvt. Ltd. Bangalore
6. Horton Casey, 1994, Atlas of Anatomy, Marshall Cavendish Books, London.
7. Keele, Neil et.al, 1991, Samson Wright's Applied Physiology, Oxford University Press, Delhi.
8. Winwood R.S, J.L.Smith, 1985, Anatomy and Physiology for Nurses, Education Academic and Medicinal Publishing Division of Hodder and Stoughton, London.

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MNS1.2 Basic Nutrition

Credits: 4

Course Objective:

To introduce the concept of nutrients and their physiological role in the daily diet.

Course:

- Concept and principles of Nutrition
- Macro and micro nutrients
- Carbohydrates, lipids, proteins, micronutrients, water
 - o Classification
 - o Function
 - o Sources
 - o Daily requirement
 - o Deficiency

Sugessted Texts:

1. Passmore R. and M.A. Eastwood 1990, Davidson and Passmore, Human Nutrition and Dietetics, ELBS, Churchill Livingstone
2. Van Way W. Charles, 1999, Nutrition Secrets, Jaypee Brothers, New Delhi
3. Joshi Subhangini A, 2007, Nutrition and Dietetics, second edition, Tata McGrawhill, Pub, New Delhi.
4. Guthrie H. A, Frances M, Human nutrition

MNS 1.3 Applied Nutrition
Credits: 2

Course Objective:

To introduce the principles of dietetics and discuss the preventive and promotive role of nutrients in health and diseases

Course:

- Introduction to Balanced Diet, Food Pyramid and Basic five Food groups.
- Foods and their Nutritive value, formulation of exchange list, efficacy of exchange list
- Diet for sedentary, moderate and heavy activity, adult man and woman, principles of standardization of raw ingredients
- Development of nutritional recommendations, development of the Recommended Dietary Allowance (RDA) and other food guides; the Dietary Reference Intakes (DRI);
- Indian administrative structure of regulatory agencies pertinent to nutrition recommendations;
- Introduction to scientific methods used to determine the recommendations; food labeling laws; nutrition recommendations
- Examples of dietary modifications with specific examples including pathophysiology and altered biochemistry of some common diseases and disorders
 - o Fever and infection
 - o Childhood infections ---diarrhoea, acute respiratory infection, measles
 - o Common infections ---tuberculosis, HIV/AIDS
 - o Non-communicable disease

Sugessted Texts:

1. Antia F.P, Clinical dietetics and nutrition 7th edition, Oxford University Press
2. Passmore B, and M.A. Eastwood, Human Nutrition and Dietetics, Ed, ELBS. Churchill Livingstone.
3. Krause M.V and L.K. Mahan, 2000, Food Nutrition and Diet Therapy, W.B.Saunders Company, London.
4. Williams S.R, Nutrition and Diet Therapy, C.V Morsby Co. St.Louis.

MPH 1.4 Epidemiology

Credits : 5

Course Objectives:

To familiarize students on concepts and use of epidemiology, methods to measure and describe health of populations and risk measurement

Course:

- Historical aspects, definition, aim and uses
- Descriptive epidemiology
- Determinants of disease, Natural history of disease
- Epidemiological principles in prevention and control disease
- Risk measurement, Measurement of morbidity and mortality: Incidence, Prevalence, Age-adjustment and survival analysis, use of morbidity and mortality
- Epidemiological study designs
- Bias, confounding and interaction
- Causal association
- Nutritional surveillance

Suggested texts :

1. Gordis Leon Epidemiology (3rd edition) ,W B Saunders and Co.
2. Beaglehole. R. Bonita, et. al Basic Epidemiology :, WHO Publication, Geneva, 1993.
3. David E., et. al. Foundations of Epidemiology : Oxford University Press, New York, 1984.
4. Barkar, D.J.P., Practical Epidemiology : Churchill pub, Livingstone, 1982.
5. Epidemiology in health care planning : E.A. Knox (ed), Oxford University Press, New York, 1979.
6. Katz Mitchell: Study Design and Statistical Analysis: A Practical Guide for Clinicians
7. Last, J.M., Spasoff, R.A. Harris, S. S. and Thuriaux, M.C. (Eds): A Dictionary of Epidemiology, Oxford University Press, New York, 4th Ed., 2001.
8. Mayer Dan Essential Evidence-Based Medicine Series: Essential Medical Texts for Students and Trainees
9. Silman and McFarland: Epidemiological Studies A Practical Guide 2nd Edition
10. Aschengrau and Seage: Essentials of Epidemiology in Public Health
11. Friis Robert: Epidemiology for Public Health Practice, Third Edition

12. Timmreck Thomas C: An Introduction to Epidemiology, Third Edition
2002

13. Szklo Moyses: Epidemiology: Beyond the Basics -
2003

MPH 1.5 Biostatistics

MPH 1.51 Principles of Biostatistics

Credits: 3

Course Objective:

- To introduce students to the use of bio-statistics in health sciences

Course :

- Levels of measurement
- Measures of central tendency, Measures of variability, Skewness, Kurtosis
- Probability and Binomial, Poisson, Normal and t Distribution
- Sampling methods
- Confidence Intervals for mean(s) & proportion(s)
- Test of Significance
- Nonparametric tests
- Association and Causation
- Correlation and regression
- Analysis of Variance
- Multivariate analysis

MPH 1.52 Statistical Analysis

Credits: 2

Course objectives:

- To make students aware of pitfalls in statistical analysis
- To train students in presentation and interpretation of data
- To impart examples of utilization of data in decision making
- Training in usage of appropriated statistical software and in handling of large datasets

Course:

- Data entry, analysis, presentation
- Training in statistical software SPSS

Suggested texts:

1. An Introduction to Biostatistics: A manual for students in Health Sciences: P.S.S. Sundar Rao, J. Richard Prentice Hall , New Delhi, 1996.
2. Bio-Statistics: A foundation for Analysis in the Health Sciences: Daniel, W.W., John Wiley and Sons Pub., Canada, 1991.
3. 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.
4. Bio-Statistics perspective in Health care research and practice : Verma, B.L., Shukla, G.D., et., al , C.B.S. Pub. New Delhi 1993.
5. Handbook of Statistics: Krishnaiah, P.K. Rao, C.R. (ed), Elsevier Science Pub. Netherlands, 1988.

DS 1.0 Research Methods I:**Credits 5****Course objective:**

- A) To introduce students to the steps in research
- B) To train in methods of conducting and writing a literature review.

Course:

Students will attend presentations of each Principal Investigator, collect basic research reviews and relevant articles and use these to prepare a review which will be submitted for end of term evaluation.

SEMESTER II

MNS 2.1 Infectious Diseases and Nutrition
Credits : 3

Course Objective:

To provide an overview of infectious diseases of public health importance in developing countries and their impact, nutrition and infection

Course:

- Infectious diseases and their impact
- Immunity and nutrition
- Malnutrition and infection
- Vaccine preventable diseases
- Other infectious diseases of public health importance---malaria and other vector borne diseases, leprosy, HIV/AIDS etc

Suggested texts:

1. Jonathan P and Paul Murray, 1995, Biology of disease, Blackwell Science Ltd.Australia.
2. World health organization: report of infectious diseases, and report on multidrug resistance.Geneva
3. Cecil, Bennet et.al.,1992, Textbook of medicine,Harcourt Brace Joanwich inc. U.S.A

MNS 2.2 Nutrition and Metabolism
Credits: 4

Course Objective:

To provide an understanding of the metabolism of nutrients

Course:

- Metabolism of macronutrients, i.e.
- Carbohydrates – glycolysis, TCA cycle, HMP shunt, Cori cycle, glycogen metabolism, regulation of blood sugar
- Lipids- Beta oxidation of fats, metabolism of saturated and unsaturated fats
- Proteins – Transamination, deamination, oxidative deamination, urea cycle
- Brief overview of selected micronutrients

- Role of enzymes, hormones in health and disease, bioenergetics
- The genetic material, and its role in controlling the homeostatic regulators of the body

Suggested texts:

1. Brownie Alexander C, John C, Kernohen, 2005, Medical Biochemistry second edition, Elsevier Pub.
2. Kuchel Philip W, Gregory B. Ralston, 2003, Shaum's Outlines, Biochemistry, Second edition, Tata Mc Graw Hill Pub.
3. Murray Robert K, Garner K Daryl, Victor W. Rodwell, 2006, Harpers Illustrated Biochemistry, 27th edition, Mc Graw Hill Pub.
4. Nelson David L, Micheal M.Cox, 2003, Lehninger – Principles of Biochemistry, Tenth edition, McMillan press.
5. Satyanarayana U, Chakrapani U, 2006, Biochemistry, Third edition, Uppala Author Pub

MNS 2.3 Diet Therapy and Clinical Nutrition
Credits 5

Course objective:

To explain the role of nutrition in various diseases and disorders.

1. Nutrition for weight management
2. Nutrition and Bone Health
3. Nutrition for oral and dental health
4. Nutritional therapy for
 - a. Some upper and lower GIT Disorders for liver biliary system and exocrine biliary disorders.
 - b. For DM
 - c. Anaemia
 - d. Tuberculosis and Pneumonia
 - e. CVD and Hypertension
 - f. Renal Disorder
 - g. Cancer and Cancer prevention, treatment and therapy.
 - h. HIV
 - i. Rheumatoid disorder
 - j. Metabolic disorder

MNS 2.4 Survey Methods

Credit: 1

Course objectives:

To introduce students to survey methods including research ethics.

Theoretical Component to course MNS 2.5 Nutritional Assessment (Practical)

Course:

- Steps in conducting a survey, sampling methods and their application to research in community nutrition.
- Ethics in biomedical studies, especially nutrition
- Execution of a small research project including framing of objective, development of data collection instruments and methods, analysis, report writing and presentation of results.

Suggested texts:

1. Health Research Methodology, WHO Manual.
2. Kothari C.R. 2004. Research Methodology, 2nd Edt. New Age International Pub.

MNS 2.5 Nutritional Assessment (Practical)

Credits: 5

Course Objective:

To enable the students to develop skills in the various techniques of assessment of nutritional status, Principles of precision, accuracy, and interpretation of results for individuals and populations.

Course:

- Anthropometry - Growth charts. Height and weight measurements, BMR, BMI calculations, interpretations
- Nutrient intake analysis – Energy expenditure, Diet recall, Food frequency, Weighment method etc.
- Nutritional questionnaires
- Nutritional screens - Physical examinations, Biochemical and biophysical assessment methods

- Standards for comparison – RDA, NCHS standards, ICMR standards
- Biochemical Analysis - Estimation of Hemoglobin, S. Ferritin, Estimation of serum proteins, Estimation of urinary and blood glucose,

Suggested Text:

1. Annual Report-Ministry of Health and Family Welfare- Govt. of India
- 2.Elizabeth K.E., 2005, Nutrition and child Development, 3rd edition, Paras Publishing
- 3.Gopaldas J and S. Sheshadri, Nutrition Monitoring and Assessment, Oxford University Press.
4. Varley, 1980, Practical Clinical Biochemistry, .I. & II London, Heinemann.
5. Wardlaw G.M and P.M.Insel, 1992, Perspectives in Nutrition, 2nd edition Mosby, Sydney, Toronto.

MNS 2.6 Nutrition Laboratory

Credits 5

Course Objectives:

To introduce students to more advanced methods of nutritional laboratory sciences including biomarkers of nutrition.

Course:

- Introduction to the biochemistry laboratory, instrumentation
- Biosafety practices, Universal Safety Precautions
- Food analysis: Protein, Fat, Calorific value, Ash/Organic matter, Osmolarity, Rancidity, Amino acid profiles, Fatty acid profiles , Trans fatty acids , Omega-3 polyunsaturated fatty acids , Carbohydrates , Total sugars , Total dietary fibre, Starch, Vitamin/mineral profiles
- Estimation of the following in serum/other body fluids and interpretation
- Analysis of proteins : Total protein, serum albumin, globulin, AG Ratio
- Enzymes of clinical significance : SGOT, SGPT, ALP

- Identification of sugars : glucose, maltose, fructose, estimation of blood glucose
- Lipid profile : serum total cholesterol, LDL, VLDL, HDL, TG, LDL:HDL ratio
- Urine analysis for urea, uric acid, creatinine, glucose, protein
- Resolution of proteins using SDS-PAGE,
- Basic methods in immunology, ODD, QPA, ELISA, Western blotting

Suggested Texts:

1. Raghuramalu, et.al. 2003. A Manual of Laboratory Techniques, NIN , Hyderabad.
2. Mohanty, B. et.al. 2006. Fundamentals of Practical Biochemistry. B.I. Pub.

DS 2.0: Research Methods II
Credits 5

Course objective:

To train students in appropriate selection of methodology

To expose the students to some techniques in laboratory sciences

Course:

Students will rotate in their laboratories/ facilities of each Principal Investigator, identify methods and techniques of research and reference them and prepare a report for end of term evaluation.

SEMESTER III

MNS 3.1 Applied Nutrition – Practical

Credits: 4

Course Objectives:

Introduction to planning & preparation of normal & traditional diets
Dietary management in the treatment of various disease conditions

Course:

- Diet planning for adult male, female -- Sedentary, moderate & heavy activity.
- Standardization of Raw Ingredients
- Standardization of common food recipes. Cooking practical.
- Modification of the normal diet.
- Planning of therapeutic diets for some common disorders.
 - o Diet for undernourished children
 - o Women with anemia
 - o Undernourished women
 - o Child with fever, diarrheas, ARI
 - o CHD and diabetes
 - o Osteoporosis and arthritis

Suggested texts:

1. ICMR, 2004. Nutrient Requirements and RDA for Indians, New Delhi
2. NIN and ICMR, 2004. Nutrition for mother and Child, Hyderabad.
3. NIN, 2006. Nutritive Value of Indian Foods, Hyderabad.

SHS 3.2 Human Genetics

Total credits : 5 credits

Course Objectives:

1. To present the fundamentals of human genetics with specific reference to health and disease
2. Methods in studying human inheritance
3. Overview of the mechanism of disease

Course: 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.

Course: UNIT II : The human genome, genes and disease :

8. Organization of the human genome, number, functional diversity, structural diversity, gene expression, epigenetic mechanisms, multigene families, repetitive DNA
9. Genetic basis of human disease : chromosomal abnormalities, prevalence, presentation, chromosome structure, analysis and classification of abnormalities
10. Single gene alterations: patterns of inheritance, molecular pathology
11. Molecular pathology : presentations
12. Diseases with a genetic predisposition
13. Genetic testing and ethical issues

References:

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

SHS 3.3 Laboratory Methods in Health Sciences II

Course objectives:

The set of laboratory exercises take the student through the basic techniques of molecular biology

Course:

1. Isolation of plasmid and genomic DNA
2. Agarose gel electrophoresis
3. Restriction digestion of DNA
4. Ligation
5. Transformation and analysis of transformants
6. Polymerase Chain Reaction
7. Isolation of proteins
8. SDS-PAGE
9. Western blotting

References:

3. Current Protocols in Molecular Biology, John Wiley and Sons, Inc 2007.
4. Molecular cloning, Sambrook and Maniatis, 2nd edition, CSHL Press, 1995

SHS 3.5 Gene and Cell Manipulation

Total Credits: 5

Course Objectives:

- c) To understand the role of recombinant DNA technology in prevention, health promotion and therapeutics
- d) Technique for production of pharmaceuticals, vaccines, gene therapy

Unit I: Basic techniques

- j. Electrophoresis, PCR, nucleic acid blotting techniques, Sequencing, transformation/transfection, use of restriction enzymes and ligases
- k. Techniques for studying gene expression: Hybridization techniques (Northern hybridization, in situ hybridization, DNA microarrays), PCR (RT PCR, Real time PCR), in vitro mutagenesis.
- l. Cloning of genes: vectors used for cloning and expression, strategies for cloning genomic DNA, screening strategies, strategies for cloning RNA, and production of gene libraries.
- m. Transgenic technology

- n. Techniques for recombinant pharmaceuticals and vaccines, genetically engineered antibodies and expression cloning.
- o. Gene therapy and DNA vaccines.
- p. Pharmacogenomics.
- q. Stem cells and cell engineering: production of adult and embryonic stem cells, different stem cell engineering techniques. Use of stem cells in cloning, in cases of tissue rejection, and their use in therapeutics, ethical considerations
- r. Cell culture : Principles of sterile techniques and cell propagation, methods for scaling up cultures, Defined media, role and constituents of serum, selection of medium, Cell separation methods. Organ culture, processing tissues for histology. Cytotoxicity and viability assay

References:

1. Principles of gene manipulations, Old and primrose, Blackwell scientific publications, 4th edition, 2002.
2. Genome analysis and Genomics, 3rd edition, Primrose, Blackwell Publishing Limited; 3 edition 2002
3. Human Molecular Genetics, Strachen and Read, 2nd edition, BIOS Scientific Publishers, 1999
4. Genes VII, Lewin, Oxford University Press, USA 1999
5. Molecular cloning, Sambrook and Maniatis, CSHL Press, 1995
6. WHO Technical Publications: Vaccines, Human Genetics Program series.

DS3.1: Nutrition through the Life Cycle

Credits: 2

Course objectives:

- The course is aimed to providing an insight into the specific nutrient needs for mothers, children and adolescents, various policies and their impact.
- To provide students with the knowledge of policies and programmes to upgrade maternal and child health

Course:

Nutritional requirements through the life cycle – Pregnancy, lactation, infancy, pre-school, school going, adolescence, elderly.

- Physiology and special needs during pregnancy, lactation, infancy, childhood and adolescence, caloric requirements, iron and folic acid supplementation.
- Relationship between maternal diet and pregnancy outcomes, recommended diet during pregnancy
- Overview of physiological and biochemical processes underlying human lactation and nutritional needs for both mother and infants.

- Physiology and development of infants, nutrient requirements, nutrition for low birth weight infants
- Nutrition in childhood, child health and morbidity, neonatal, infant and child mortality, IMR, U5MR, link between mortality and malnutrition,
- Nutrition in adolescence.
- Nutrition in aging
- Sources of data, nutritional profiles of the vulnerable sections of society, maternal mortality and issues relating to maternal health, gender issues and maternal health.
- Family welfare services in India, current status, population policy; health planning in terms of family planning, health services, initiatives, programmes and policies related to child health and development including immunization programmes, Vitamin A prophylaxis, nutritional supplementation programmes, ICDS, school lunch, etc:

Suggested texts:

Mahan K., and Escott-Stump S., Krause's Food, Nutrition and Diet Therapy, Elsevier USA.

Ghai O.P., Management of Primary Health care, Inter Pub.

Weaning from Breast milk in family food – A Guide for health and community workers, WHO & UNICEF Pub.

ACASH1991, Maternity home practices and Breast feeding, Chitanakshar graphics, Bombay.

WHO, 1978, Growth charts for international use in maternal and child health care, Guidelines for primary health personnel.

Dutta, D.C. textbook of Obstetrics and Gynaecology, Ministry of Health and Family Welfare.

DS 3.2: micronutrient Deficiency and Disorders

Credits: 2

Course objective:

To make the students aware of prevalent nutritional deficiencies.

Course:

- Nutritional and non-nutritional signs and symptoms, physiological basis, clinical manifestations and treatment PEM, Vitamin, Iron, Calcium, Iodine, Fluorine

- Scheme and programmes in India to combat nutritional problems

Suggested texts:

1. Biochemistry texts
2. Gopalan C, Nutrition research in South Asia: The emerging agenda of the future, 1996

DS 3.32: Non-communicable diseases: Overview

Credits: 1

Course objective:

To give an overview of Non- Communicable Diseases

Course:

Epidemiology of N CDs, Risk factors, prevention and management, general strategies, pathophysiology (including biochemical and genetic parameters), cardinal signs, clinical and diagnostic features (with special emphasis on biochemical parameters), treatment (emphasis on pharmacological component), prevention and control of the following: Asthma and COPD, cancer, Chronic Rheumatic Diseases, Obesity,.

References:

Appropriate textbooks and research papers,
World Health Reports Archives: 1995-2005.

DS3.4: CVD Credit I

DS 3.5: Diabetes Credit I

Course objectives:

To provide an overview of these diseases and provide an overview of the ongoing research areas.

Course:

Pathophysiology (including biochemical and genetic parameters),cardinal signs, clinical and diagnostic features (including laboratory parameters), treatment (emphasis on pharmacological component), epidemiology, prevention and control, national and global programmes.

DS 3.6 Dissertation I

Credits 5

Course Objective:

To train students in the development of a research study

Course:

Students will identify/ will be assigned a dissertation guide and will submit and defend proposed dissertation work including detailed literature review, justification of topic, objectives and proposed methodology. Dissertation work will be the start point of the Ph.D. study.

SEMESTER IV

SHS 4.6 Laboratory Methods in Health Sciences III

Credits: 5

Course objectives:

- a. To provide practical skills in human genetics
- b. To provide essential information on universal safety practices.

Course:

- a. Essential aspects of biosafety, universal safety practices and guidelines for Recombinant DNA work.
- b. Method of collecting pedigree data and pedigree analysis, risk assessment.
- c. Isolation of human DNA
- d. Demonstration of Mendelian Principles using animal models, human pedigrees and DNA markers.
- e. Karyotyping

Suggested texts:

1. Current Protocols in Molecular Biology, John Wiley and Sons, Inc., 2007.
2. Molecular Cloning, Sambrook and Maniatis, 2nd Edn., CSHL Press, 1995.

DS 4.1: Scientific Reading

Credits: 2

Course objective:

To train in scientific reading, analysis and interpretation.
Method of scientific presentation

Course:

Students will in consultation with dissertation guide select and present 2 articles. One article will relate to the same area of the research as that selected for the dissertation. Other articles should be unrelated to dissertation topic.

DS 4.2: Proposal Writing

Credits: 3

Course objective:

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

Course:

Students will write a research grant or PhD fellowship application including ethical guidelines and other regulatory requirements.

DS 4.3: Dissertation II

Credits: 5

Course:

Presentation of findings and final defence.

SYLLABUS

Master of Science Health Sciences **(DIETETICS)**



Interdisciplinary School of Health Sciences

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M.Sc. Health Sciences (DIETETICS)

Background

Health Sciences also successfully conducts a full time Masters programme in Health Sciences (Dietetics). The course is complemented with a six months internship in hospital Dietetics department to offer practical support to the theoretical knowledge. The course aims at facilitating the understanding of the preventive, promotive and curative role of diet in health care, enabling students to make appropriate dietary modifications for various therapeutic conditions. Ongoing projects include development of food products with therapeutic modification, assessment of nutritional status of various age groups like children, adolescents, athletes, elderly, hospitalized individuals etc. Considerable work has been done on omega-3 fatty acids, and its role in normal and therapeutic nutrition.

Goal of the MSc Health Science (DIETETICS) programme

The Masters in Health Sciences Dietetics programme aims to build knowledge and skills in Nutrition and Dietetics with focus on

- Planning normal and Therapeutic diets.
- Artificial Nutrition support in critical care.
- Nutritional assessment of various segments of the community through anthropometry, biochemical, clinical and dietary assessment.
- Application of Knowledge and skills to critical needs and issues at the community and hospital levels through internships.
- Developing research skills in various aspects of nutrition and dietetics.

Career opportunities

The M.Sc Health Sciences Dietetics programme will provide career and employment opportunities for students in academic, hospitals and health care facilities, sports nutritionist in fitness centers, food and nutrition industries, educational institutes, community and public health facilities and as a private consultant.

Eligibility

BSc. any subject including Nursing, Home Sciences and Nutrition, Degree in any branch of Medicine or Pharmacy from any statutory University or recognized as equivalent there to by the University of Pune, with at least 50% for open and 45% marks for reserved category students.

Number of seats : 20

Fees : As per rules of University of Pune

Teaching and evaluation

MSc Health Sciences is offered as a two year full time course. Students need to complete 100 credits in order to obtain the Masters degree. 75 credits are compulsory from the School. Remaining 25 credits can be taken from any other post-graduate department of the University of Pune, (those courses which are under the University credit system). The two-year course is organized into four teaching Semesters. Each Semester consists of 15 weeks of teaching. One credit hour is equivalent to 15 hours of teaching. There is one hour of assessment for every 4 hours of teaching. Assessment may be in the form of evaluation of long/short written answers, multiple choice questions, presentation, term papers, assignments etc. 40% of assessment is done during term so that there is continuous evaluation of the student, 60% assessment is done at the term end examination (held around May and November respectively).

M.Sc. Health Sciences (DIETETICS)

FIRST SEMESTER: - (27 credits)

- DD1.1: Principles Of Nutrition And Meal Management (2 units - 5 credits)
- DD 1.1A: -Principles of Nutrition (1 unit - 3 credits)
- DD1.1B: -Meal Management (1 unit - 2 credits)
- DD1.2 Clinical Biochemistry And Physiology (2 units - 8 credits)
- DD1.2A: Clinical Biochemistry (1 unit - 4 credits).
- DD1.2B: Physiology (1 unit - 4 credits).
- DD 1.3: Diet Therapy (1 unit - 5 credits)
- DD 1.4: Community Nutrition & Epidemiology (1 unit - 4 credits)
- DD 1.5: Practical I (1 unit - 5 credits)

SECOND SEMESTER: -(23 credits)

- DD 2.1: Clinical Nutrition (1 unit - 5 credits).**
- DD 2.2 A: Hospital Organization & Personnel Management (1 unit - 2 credits)
- DD 2.2B: Sports Science And Nutrition (1 unit - 2 credits)
- DD 2.3A: Catering Management (1 unit - 2 credits)
- DD 2.3B: Dietetic Techniques & Patient Counseling (1 unit - 2 credits)
- DD 2.4: Practical II (1 unit - 5 credits)
- DD 2.5 Research Methods (1 unit - 5 credits.)

THIRD SEMESTER: - (25 credits)

- DD 3.1 Sports Nutrition & Dietetics (1 unit - 5 credits)
- DD 3.2 Pediatric And Geriatric Dietetics (2 units - 5 credits)
- DD 3.2a: Pediatric Dietetics (1 unit - 2 credits)
- DD 3.2b: Geriatric Dietetics (1 unit - 3 credits)
- DD 3.3 Advance Dietetics (1 unit - 5 credits)
- DD 3.4 Practical III (1 unit -5 credits)
- DD 3.5 Project I (1 unit- 5 credits)

FOURTH SEMESTER :- (25 credits).

- DD 4.1 Internship (25 credits).

M.Sc. Health Sciences (DIETETICS)

SEMESTER I (27 credits)

DD1.1: PRINCIPLES OF NUTRITION AND MEAL MANAGEMENT (2 units - total 5 credits)

Objective:

- To introduce the concept of nutrients & its relation to the daily diet.
- To study the inter relationship between food, nutrition & health.

DD 1.1A: -Principles of Nutrition (3 credits)

Course:

Concept of Nutrition:

Introduction to nutrition, inter relationship between food, nutrients & health. Nutritional Status. Common terms related to nutrition.

Energy:

Introduction, Physiological fuel value, Direct & indirect calorimetry. Basal Metabolic Rate, Total Energy Expenditure, Specific dynamic action, Respiratory Quotient & its calculation. Associated nutritional problems – malnutrition (over & under nutrition – PEM – Kwashiorkar & Marasmus) .

Carbohydrates:

Classification, function, sources, RDA & deficiency.

Fibre – types, role in health and diseases.

Lipids:

Classification of fatty acids, Function, sources, RDA, & deficiency. Saturated fat, MUFA, PUFA, essential fatty acids, prostaglandins. Cholesterol – introduction, sources, requirement.

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.

Vitamins:

Classification – Fat soluble & water soluble, function, sources, RDA & deficiency.

Minerals:

Major minerals – Ca, P, Mg, Na, K.

Minor minerals – Fe, I, F, Zn, Co, Mn, Se, S, Cr.

Their function, sources, RDA & deficiency.

Water:

Role of water in the body, its requirement, extracellular & intracellular fluid, maintenance of water balance

DD 1.1B Meal management.**(2 credits)****Course:**

Meal planning: Introduction to meal planning, basic five food groups, meal exchange list. Factors affecting food acceptability. Cultural food pattern – traditional diets.

Meal planning for infancy and childhood :

RDA during 0-1 yrs, Weaning foods. Factors influencing meal planning for Preschool , School going and adolescent.

Meal planning for Adults:

RDA for adult man and woman with different level of activity. Factors influencing the dietary food selection.

Meal planning for old age:

Nutritional requirement during aging, physiological changes, dietary modification for geriatric patients.

Meal planning for Pregnancy and lactation:

Nutritional requirement for pregnancy and lactation, RDA, Galactogauges.

Sugessted Texts:

1. Passmore R. and M.A. Eastwood 1990, Davidson and Passmore, Human Nutrition and Dietetics, ELBS, Churchill Livingstone
2. Van Way W. Charles, 1999, Nutrition Secrets, Jaypee Brothers, New Delhi
3. Joshi Subhangini A, 2007, Nutrition and Dietetics, second edition, Tata McGrawhill, Pub, New Delhi.
4. Guthrie H. A, Frances M, Human nutrition
5. Antia F.P, Clinical dietetics and nutrition 7th edition, Oxford University Press
6. Krause M.V and L.K. Mahan, 2000, Food Nutrition and Diet Therapy, W.B.Saunders Company, London.
7. Williams S.R, Nutrition and Diet Therapy, C.V Morsby Co. St.Louis.

DD1.2 CLINICAL BIOCHEMISTRY AND PHYSIOLOGY (2 units - total 8 credits)

Objective:

- To provide an understanding of the metabolism of nutrients
- To provide an understanding about the structure and function of the human body with an emphasis on the principles of human physiology with reference to human health and disease.

DD1.2A: Clinical Biochemistry (1 unit - 4 credits).

Course:

Carbohydrate Metabolism:

Classification of carbohydrates, Glycolysis, TCA cycle, Oxidative Phosphorylation, HMP shunt, Energetics of Aerobic & Anaerobic breakdown, Glycogenesis, Glycogenolysis, Gluconeogenesis. Regulation of Blood Glucose. Altered metabolism in Diabetes Mellitus.

Protein Metabolism:

Classification of Proteins – Amino acids – essential and non-essential. Transamination, Deamination (oxidative & non oxidative pathways) decarboxylation for aminoacids. Pathway for the entry of aminoacids into the TCA cycle. Urea cycle., Creatine & creatinine synthesis. Changes in the blood pictures in PEM, Pregnancy, liver disorders.

Lipid Metabolism:

Classification, Oxidation of fatty acids – odd & even numbered – Beta oxidation. Ketone body formation & ketosis – control mechanism. Lipoproteins – types, mechanism. Cholesterol synthesis. Role of carnitine in lipid metabolism. Lipid changes in CVDs.

Nucleic Acid Metabolism:

RNA, DNA.

Enzymes & Hormones:

Enzymes: Classification, intracellular distribution of enzymes. Enzymes in clinical diagnosis (ALT, AST, Alkaline Phosphatase).

Hormones: Classification, hormonal control on Carbohydrate, protein & lipid metabolism.

- a) Pancreas: Insulin & Glucagon.
- b) Thyroid: T3, T4.
- c) Parathyroid, calcitonin.
- d) Medulla- epinephrine & norepinephrine.
- e) Cortex: Glucocorticoids & mineralocorticoids.

Inborn errors of metabolism:

Alcaptone, PKU, Albinism, Maple syrup urine disease etc.

Suggested texts:

1. Brownie Alexander C, John C, Kernohen, 2005, Medical Biochemistry second edition, Elsevier Pub.

2. Kuchel Philip W, Gregory B. Ralston, 2003, Shaum's Outlines, Biochemistry, Second edition, Tata Mc Graw Hill Pub.
3. Murray Robert K, Garner K Daryl, Victor W. Rodwell, 2006, Harpers Illustrated Biochemistry, 27th edition, Mc Graw Hill Pub.
4. Nelson David L, Micheal M.Cox, 2003, Lehninger – Principles of Biochemistry, Tenth edition, McMillan press.
5. Satyanarayana U, Chakrapani U, 2006, Biochemistry, Third edition, Uppala Author Pub

DD1.2B: Physiology (1 unit - 4 credits).

Course:

- Introduction to Human body: Organs, tissue and cell, cell structure, cellular organelles and their functions.
- Digestive system: Structure and function of GI tract. Digestion and absorption of protein, fat & CHO.
- Cardiovascular system: Structure and function of blood vessels, Structure of Heart-Cardiac cycle, cardiac output. Blood pressure-factors affecting it, Hypertension, Heart rate and heart control mechanism.
- Endocrine system: Hormones secreted by endocrine glands, effect on metabolism, hypo, hyperactivity of thyroid, parathyroid, adrenal pituitary, pancreas.
- Physiology of reproduction, menstruation, pregnancy and lactation.
- Excretory system and skin.
- Physiology of Kidney, mechanism of urine formation, Acid base balance, Fluid electrolyte balance, normal body temperature and mechanism of maintenance, formation of erythropoietin.
- Respiratory system: Structural plan of respiratory system, Mechanism of respiration , vital capacity, Chloride shift, control of respiratory mechanism.
- Skeletal System: Structure of bone – types of bones & joints, development of bone.
- Muscular system: Overview of muscular tissue, contraction and relaxation of skeletal muscle, exercise and skeletal muscle tissue
- Lymphatic system and immunity: Lymphatic system structure and fuction, Non specific and specific resistance, cell mediated immunity, antibody mediated immunity
- Reproductive system: Male and female reproductive system

Suggested Texts:

9. Guyton Arthur C., 1991, Textbook of Medical Physiology, A Prism Book Pvt. Ltd. Bangalore
10. Horton Casey, 1994, Atlas of Anatomy, Marshall Cavendish Books, London.
11. Keele, Neil et.al, 1991, Samson Wright's Applied Physiology, Oxford University Press, Delhi.
12. Winwood R.S, J.L.Smith, 1985, Anatomy and Physiology for Nurses, Education Academic and Medicinal Publishing Division of Hodder and Stoughton, London.

DD 1.3: DIET THERAPY (1 unit - total 5 credits)

Objective:

- To introduce the principles of dietetics and discuss the preventive, promotive and curative role of dietetics in health and disease.

- Introduction to principles of diet therapy, Recommended Dietary Allowances: def., factors, use; Nutrition care plan , Indian RDA, Food Pyramid, Balanced / Normal diet-modification of normal diet to suit special needs.

-Diets in Fever and Infection.

-Pathophysiology of fever and metabolic changes during fever. Types of fever. Dietary guidelines for fever.

-Medical Nutritional Therapy for upper intestinal tract. Introduction to GIT, Oesophagitis-types, etiology, symptoms and nutritional care. Hiatal hernia – pathophysiology, symptoms and nutritional care. Gastritis - types, etiology, symptoms and nutritional care. Nutritional care after Tonsillectomy, Dumping syndrome. Gastric and Duodenal Ulcers - pathophysiology, etiology, symptoms, medical therapy and nutritional care.

- Medical Nutritional Therapy for lower intestinal tract.

Dietary fibre, Flatulence, Constipation Diarrhoea, Steatorrhoea, Lactose intolerance, Sprue – Celiac and Tropical , Inflammatory Bowel Diseases – Crohn’s Disease and Ulcerative Colitis, Irritable bowel Syndrome, Diverticular Disease.

- Medical Nutritional Therapy for diseases of the liver, pancreas and biliary system.

Introduction to nutrient metabolism in the liver, Hepatitis - types, etiology, symptoms and nutritional care, Cirrhosis – pathophysiology, etiology, symptoms and nutritional care.

Hepatic Encephalopathy, Diseases of the Gall bladder, Pancreatitis.

- Diet and weight management. Body composition, Underweight. And Obesity – assessment, pathophysiology and etiology. Dietary modification for weight management.

- Medical Nutritional Therapy in Diabetes Mellitus. Classification, Pathophysiology, and Etiology.for DM Management of Diabetes mellitus, Insulin – types, action, Dietary treatment, Diabetic emergencies, Artificial sweeteners.

- Medical Nutritional Therapy in Hypertension. Classification, types, Etiology, Nutritional Care in Hypertension.

- Medical Nutritional Therapy in Coronary Heart Diseases. Important concept, Etiology, Dietary management in CHD, Congestive cardiac failure, Nutritional Care, Lipoproteins, Hyperlipidemia’s / Hyperlipoproteinemia’s. Nutritional Care in CVDs.

- Medical Nutritional Therapy in diseases of the musculoskeletal system. Arthritis, gout, Osteoporosis: Pathophysiology, etiology and medical nutritional therapy for Musculoskeletal system.

Suggested texts:

1. Antia P.P, Clinical Dietetics and Nutrition, 1989, 3rd edition, oxford university press
2. Robinson C, Lawler W.L, Chenoweth, A.E Garwick, 1986,Normal and therapeutic Nutrition, I7th edition McMillan Pub.

3. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders
4. Williams S.R. 1986, Essentials of nutrition and diet therapy, 4th edition, Morsby College Pub.
5. Whitney, E. N. and C. B. Cataldo: 1983. Understanding Normal and Clinical Nutrition, West Pub. S1. Paul,
6. Thomas, B.: Manual of Dietetic Practice, 1996

DD 1.4: COMMUNITY NUTRITION & EPIDEMIOLOGY (1 unit - total 4 credits)

Objective: To create awareness about the nutritional needs of the community.

Course:

- Concepts and Scope of Community Nutrition.
 - Food availability and factors affecting food availability and intake. Agricultural production, post harvest handling (storage & treatment), marketing and distribution, industrialization, population, economic, regional and socio-cultural factors. Strategies for augmenting food production.
 - Assessment of Nutritional status- Meaning, need, objectives and importance. Use of clinical signs, anthropometry, biochemical tests, and biophysical methods. Assessment of food and nutrient intake through recall, record, weighment.
 - Food security and adequacy of diets.
 - Nutritional problems of communities and implications for public health Common Nutritional Problems in India. Incidence -National, Regional.
 - Nutritional and Non-Nutritional signs, symptoms, effect of deficiency and treatment, for:- PEM , Micronutrient Deficiencies , Fluorosis , Correction/Improvements in diets
 - Schemes and Programs in India to combat Nutritional Problems in India. Role of international, national and voluntary agencies and government departments.
 - Nutrition Policy of India and Plan of Action.
 - Health and Nutrition Education: Steps in planning, implementation, and evaluations. Use of educational aids - visual, audio, audio-visual, traditional media etc.
- Food Microbiology:-
- Microorganisms important in food microbiology, - Molds, Yeasts, Bacteria.
 - Contamination of food from natural sources.
 - Principles of food preservation & spoilage. Contamination,
 - Preservation, & spoilage of different foods.
 - Foods & enzymes produced by microorganisms. —Food fermentation –food enzymes
 - Food additives.
- Epidemiology:-
- Nutritional epidemiology - an introduction.
 - Basic issues in designing and interpreting epidemiological research
 - Objectives of epidemiological research, types of epidemiological research,
 - Epidemiological measurements
 - Interpretation of epidemiological research.
 - Sampling, study size, and power
 - Errors in nutritional epidemiology: effects and remedies
 - Food consumption, nutrient intake and use of food composition tables.
 - Use of existing data and house- hold based surveys.
 - Ecological, Case control, Cross-sectional and cohort studies

Suggested Texts:

1. Gopalan.C, 2006, Towards India's nutritional well being: Need for a second wind., NFI Bulletin, Vol 27, No:1.
2. Gopalan.C, 1996, Nutrition research in South-East Asia, The emerging agenda for future. WHO, AITBS publishers, New Delhi.
3. Seshadri Malini, Siddhu Anupa, 2003, Nutrition goals for Asia – Vision 2020, Proceedings of IX Asian Congress Of Nutrition, NFI Publishers New Delhi.
4. Srilakshmi. B: 2002, Dietetics, IVth edition, New Age International (P) Ltd.
5. Vaughan and Morrow , 1989 , Manual Of Epidemiology for district health management, WHO, Geneva
6. Gordis Leon, 2004, Epidemiology 3rd edition, Elsevier Pub.
7. Food microbiology by W.C. Frazier.

DD 1.5: PRACTICALS (1 units - total 5 credits)

Objective:

To impart practical skills in Therapeutic diet planning.

Course:

- Dietary planning for an adult man and woman – Sedentary, moderate & heavy activity.
- Standardization of Raw Ingredients. Lab work
- Standardization of common food recipes. Cooking practical.
- Dietary planning for pregnant woman, lactating woman, geriatric patient.
- Recipes for weaning foods.
- Dietary planning for Regional Diets.
- Modification of the normal diet.
- Planning of therapeutic diets for GI disorders.
 - a. Peptic Ulcer.
 - b. Esophagitis.
 - c. Hiatal Hernia.
- Planning of therapeutic diets in liver disorders. a. Hepatitis b. Cirrhosis. c. Hepatic Encephalopathy.
- Determination of body composition by means of anthropometry, three day diet recall calculation.
- Diet planning for obesity.
- Diet planning for Diabetes. (insulin dependant and non insulin dependant, Gestational diabetes.
- Diet planning for cardiovascular disease:- Hyperlipidemias, hypertension,. and arteriosclerosis, congestive cardiac failure.

Suggested texts:

1. ICMR, 2004. Nutrient Requirements and RDA for Indians, New Delhi
2. NIN and ICMR, 2004. Nutrition for mother and Child, Hyderabad.
3. NIN, 2006. Nutritive Value of Indian Foods, Hyderabad.
4. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders.
5. ASPEN; Nutrition Support, Dietetics

SEMESTER II (23 credits)

DD 2.1: CLINICAL NUTRITION (1 unit - total 5 credits).

Objective:

To impart knowledge on various medical conditions in terms of medical nutritional therapy.

Course:

- Medical Nutritional therapy in Kidney diseases: Nephrotic syndrome, Nephritic syndrome, ARF, CRF/ESRD, Dialysis and Kidney Transplant.
- Medical Nutritional therapy for: Surgery, Burns, Sepsis, and Trauma.
- Medical Nutritional therapy in Cancer.
- Medical Nutritional therapy in HIV and Aids.
- Diet for Anaemia: Types of Nutritional anaemia, nutritional therapy.
- Medical Nutritional therapy in diseases of musculo skeletal system: Rheumatoid & osteoarthritis, gout, osteomalacia & osteoporosis.
- Medical Nutritional therapy in neurological disturbances and in born errors of metabolism.
- Medical Nutritional therapy for oral and dental health.
- Medical Nutritional therapy in malabsorption syndrome.
- Dietary modification in food allergy and intolerance.
- Drug and nutrient interaction.

Seminar:-

Ayurveda- Concept of prakruti or constitutional response & nutritional modification, Functional foods.

Suggested texts:

1. Shils Maurice, James A. Olson, Skike Mosche, Catherine Ross, 2006, Modern Nutrition in health and disease, Tenth edition, Williams and Wilking pub.
2. Kirby Donald F, Dudrick Stanley J, 1994, Practical handbook of nutrition in clinical practice, CRC press. London
3. Bahl Saroj and J.F Hickson, Nutrition care for HIV Positive patient, A Manual for individuals and their caregivers
4. Pandya Sanjay, 2007, Practical guidelines on fluid therapy, Second edition.
5. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders Co

DD 2.2 A: HOSPITAL ORGANIZATION & PERSONNEL MANAGEMENT (1 unit - total 2 credits)

Objective:

The objective of this course is to introduce a hospital as an organization, discuss the role of personnel management in an organization and an overview of the functioning of the hospital dietary department.

Course:

Organization:

Introduction, organization charts-pertaining to hospitals.

Organizations: Types of organizations and characteristics.

Organizational charts of the dietary department.

Types of food service-centralized & decentralized food service.

Leadership, motivation & communication:

Dietician as a leader, leadership qualities, types of leadership.

Relation between motivation & performance, theory of motivation.

Communication:

Need to communicate, type of communication, skills of communication.

Personnel management:

Manpower planning, recruitment, selection, induction, performance appraisal, training & development.

Purchase & storage:

Purchasing- Types of market, inventory, selection of food, Periodical quality control check of food.

Storage & records required.

Laws:

Food laws.

Labour laws.

Suggested Text:

1. Boella, M. J. (1983). Personnel Management in the Hotel and Catering Industry. Hutchinson, London.
2. Drucker, P. S. (1975). Management. Allied Publishers. New Delhi.
3. Hitchcock, M. J. (1980). Food Service Systems Administration Mac Millan. New York.
4. West, B. B. and Wood, L. (1979). Food Service in Institutions. John Wiley, New York

DD 2.2B: SPORTS SCIENCE AND NUTRITION (1 unit - total 2 credits)

Objective:

To impart knowledge on the effect of exercise on the human body.

Course:

Bioenergetics: Introduction to energy transfer, Energy transfer in exercise (immediate, short term, long term energy systems), and measurement of human energy expenditure.

Body composition: types, assessment of body composition, anthropometry.

Respiratory response of Athletes to exercise: anatomy and physiology, gas exchange and transport regulation of ventilation during exercise, acid base balance.

Cardiovascular response to exercise and training: anatomy and physiology, cardiovascular regulation and interaction, function capacity of the cardiovascular function

Skeletal muscle: Structure and function, fibre types and differences, adaptation in skeletal muscle in response to training, anaerobic metabolism and muscle fatigue during high intensity

Endocrine system and exercise.

Exercise performance and environmental stress: exercise at medium and high altitude, exercise and thermal stress.

Sports injuries: Basic management principles.

Suggested texts:

1. MC Ardle, Katch F.L, Katch V, Exercise Physiology; energy nutrition and human performance 5th ed Lippincott, Williams & Wilkins.
2. Brown Stanley P, Miller wayne C, Eason Jane M, Exercise Physiology, Lippincott, Williams & Wilkins.

DD 2.3A: CATERING MANAGEMENT (1 unit - total 2 credits)

Objective: To provide skills for the management of mass food production.

Course:

- Introduction to food services and catering industry. Development of Food Service Institutions in India. Types of Services as affected by changes in the environment.
- Hospital food service as a specialty. Characteristics, rates and services of the food production, service and management in hospitals. Role of the Food Service Manager/Dietitian.
- Catering Management: Definition, Principles and Functions, Tools of Management Resources. Attributes of a successful manager.
- Management of Resources: Capital, Space, Equipment and Furniture, Materials, Staff, Time and Energy, Procedures Physical facility design and planning. Equipment selection.
- Purchase and storeroom management Purchase systems, specifications, food requisition and inventory systems, and quality assurance.
- Financial Management (in brief since there is a separate subject Food Cost and Quality Control). Elements of Financial management. Budget Systems and accounting. Budget preparation.
- Food Production and Service Operations
 - o General Planning
 - o Preliminary planning.
 - o Consideration of patients with specific nutritional and dietary needs, labour use and productivity.
 - o Flow pattern.

Suggested Text:

1. Sethi, M; Malhan, S. (1997). Catering Management; An integrated approach. New Age International.
2. Sullivan Catherine F (1990). Management of Medical Food Service 2nd Edition, Van Nostrand Reinhold, New York.
3. Livingston, G.E. (1979). Food Service Systems-Analysis, Design and Implementation -Academic Press.
4. Powers, T. F. and Powers, T. M. (1984). Food Service Operations Planning and Control. John Wiley & Sons.
5. Boella, M. J. (1983). Personnel Management in the Hotel and Catering Industry. Hutchinson, London.
6. Hitchcock, M. J. (1980). Food Service Systems Administration Mac Millan. New York.
7. West, B. B. and Wood, L. (1979). Food Service in Institutions. John Wiley, New York.

DD 2.3B: DIETETIC TECHNIQUES & PATIENT COUNSELING (1 unit - total 2 credits)

Objective:

To introduces the technical, counselling, other skills required by a dietician, her/his role in a hospital.

To enable the students ability to interpret Pathological / Clinical Parameters in health & disease.

Course:

- Dietitian as part of the Medical Team and Outreach Services.
- **Clinical Information** : Medical History and Patient Profile Techniques of obtaining relevant information, Retrospective information, Dietary Diagnosis, Assessing food and nutrient intakes, Life styles, physical activity, stress, Nutritional Status. Correlating Relevant Information and identifying areas of need.
- **The Care Process** : Setting goals and objectives short term and long term Counselling and Patient Education, Dietary Prescription.
- Motivating Patients.
- Working with: Hospitalized patients (adults, pediatric, elderly, and handicapped), adjusting and adopting to individual needs. Outpatients (adults, pediatric, elderly, handicapped), patients education, techniques and modes.
- Follow up Monitoring and Evaluation of outcome: Home visits
- Maintaining records, reporting findings, applying findings Resources and Aids for education and counselling, Terminating counselling, and education for individual patients
- Use of regional language, linguistics in communication process, counselling and education.

Suggested texts:

1. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders Co

DD 2.4: PRACTICALS (1 unit - total 5 credits)

Objective:

- To provide practical skills in dietary planning and patient counselling.
- To enable the students to develop skills in the various techniques of assessment of nutritional status, Principles of precision, accuracy, and interpretation of results for individuals and populations.

Course:

- Dietary planning in Kidney diseases: Nephrotic syndrome, Nephritic syndrome, ARF, CRF/ESRD, Dialysis and Kidney Transplant.
- Dietary planning for: Surgery, Burns, Sepsis, and Trauma.
- Dietary planning for Cancer.
- Dietary planning for HIV and Aids.
- Hospital case studies & dietary planning and preparation for various multiple disease condition.
- Nutritional screens - Physical examinations, Biochemical and biophysical assessment methods.
- Biochemical Analysis - Estimation of Hemoglobin, S. Ferritin.
- Analysis of proteins : Total protein, serum albumin, globulin, AG Ratio
- Identification of sugars : glucose, maltose, fructose, estimation of blood glucose
- Enzymes of clinical significance : SGOT, SGPT, ALP
- Lipid profile : serum total cholesterol, LDL, VLDL, HDL, TG, LDL:HDL ratio
- Urine analysis for urea, uric acid, creatinine, glucose, protein

Suggested texts:

1. ICMR, 2004. Nutrient Requirements and RDA for Indians, New Delhi
2. NIN and ICMR, 2004. Nutrition for mother and Child, Hyderabad.
3. NIN, 2006. Nutritive Value of Indian Foods, Hyderabad.
4. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders.
5. ASPEN; Nutrition Support, Dietetics
6. Raghuramalu, et.al. 2003. A Manual of Laboratory Techniques, NIN , Hyderabad.
7. Mohanty, B. et.al. 2006. Fundamentals of Practical Biochemistry. B.I. Pub

DD 2.5 Research Methods (1 unit - total 5 credits.)

Objectives:

- To orient students to the research procedure in the field of nutrition and dietetics.
- To develop their skills in relevant research methods and updating of the advances in the related research.

Course:

- Selection of a topic
- Formulating Objectives
- Selection of study design
- Tools and Technique
- Data management
- Data analysis: Learning statistical methods of data analysis.
- Report writing

SEMESTER III

DD 3.1 SPORTS NUTRITION & DIETETICS (1 unit - total 5 credits)

Objective:

- To impart the knowledge of nutrition in various sports events.

Course:

- Introduction to Nutrition: Role of carbohydrates, protein and lipids in health and exercise.
- Diet and sports performance, fluid and electrolyte loss and replacement during exercise, maxing weight for sports participation, Nutritional ergogenic aids/ supplements and exercise performance, eating disorders in athletes
- Anthropometry: Anthropometry, somatotyping, body composition, assessment, Obesity and weight control
- Sport Psychology: Definition of key concepts in sports psychology, how mind affect the athlete's physical performance, ideal performance state, motivation, arousal, mental / mind training, relaxation.
- Biomechanics: Introduction definition, Newton's laws, examples of application of biomechanics
- Doping, Women and sports: The female athlete, exercise and pregnancy,.
- Child, aged and physically challenged athlete:

Suggested texts:

1. MC Ardle, Katch F.L, Katch V, Exercise Physiology; energy nutrition and human performance 5th ed Lippincott, Williams & Wilkins.
2. Brown Stanley P, Miller wayne C, Eason Jane M, Exercise Physiology, Lippincott, Williams & Wilkins.
3. Wolinsky Ira, Nutriiton in exercise and sports, 3rd Ed CRC press, New York.
4. Driskell Judy, Sports Nutrition, CRC press New York.
5. Peterson Marlin, A guide to sports nutrition, Eat to compete. 2nd Mosby.
6. MC Ardle, Katch F.L, Katch V, Exercise and Sports Nutrition, Lippincott, Williams & Wilkins.
7. Wimberly m, Effect of habitual physical activity on the resting metabolic rates and body composition of women aged 30-35years. J Am Diet Assoc, 101,2001.

DD 3.2 PEDIATRIC AND GERIATRIC DIETETICS (2 units - total 5 credits)

Objective:

- The course is aimed to providing an insight into the specific nutrient needs for mothers, children and adolescents, various policies and their impact
- To impart knowledge on the biology and nutritional needs of the elderly

DD 3.2A: Pediatric Dietetics (1 unit - 2 credits)

Course:

- Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs.
- Neonatal nutritional needs and current infant feeding practices.
- Nutrition for Premature Infants.
- Normal Nutrition from infancy through adolescences: Growth and development, Nutritional requirement, Nutritional Assessment.
- Malnutrition: PEM and Child hood Obesity.
- Inborn Errors of Metabolism.

DD 3.2B: Geriatric Dietetics (1 unit - 3 credits)

Course:

- Physiologic Changes associated with Aging: - Changes in taste, Decrease in G.I. Motility, Decrease in lean body mass, Decrease in the ability to concentrate urine, Bone mass decrease.
- Nutritional Requirements of the Elderly: The effects of aging on fundamental nutrition processes, food and nutrient requirements: Energy, CHO, Protein, Fat, Vitamin & Mineral and water.
- Assessment of Nutritional Status: nutrition screening and assessment of nutritional status.
- Nutrition intervention and food assistance programs.
- Nutrition related disorders of older adults: Malnutrition, Obesity Anaemia, Osteoporosis etc.
- Other Health Problems: Alzheimer's Disease, Arthritis, Parkinson's Disease, Cancer, Cerebro-vascular accident, COPD, CHD, DM.
- Food and Drug Interaction.

Suggested texts:

1. Chernoff R, Geriatric Nutrition-The Health Professionals hand book, Jones and Barlett Pub.
2. Meydani M, 2001, Nutrition interventions in Aging and age associated disease, Ann NY Acad Sci 928:226.
3. Vellas B etal; 1999, Mini Nutrition assessment (MNA): Research and Practice in the elderly, Nestle Nutrition workshop Series- clinical and performance programme, Vol 1.
4. Merk 2000, Merk Manual, Protein Energy under nutrition in elderly, Whitehouse station

5. Elizabeth K.E.,2005, Nutrition and child Development, 3rd edition, Paras Publishing.
6. Mahan Kathleen L, Sylvia Escott Stump, 2001,Krause's, Food nutrition and Therapy, W.B. Saunders
7. Joshi Subhangini A, 2007, Nutrition and Dietetics, second edition, Tata McGrawhill, Pub, New Delhi

DD 3.3 ADVANCE DIETETICS (1 unit - total 5 credits)

Objective:

- To impart knowledge with specialized hospital diets in a range of critical condition.

Course:

- Metabolic response to starvation, injury & sepsis.
- Physiology of nutrient absorption & patterns of intestinal metabolism.
- Enteral nutrition: - Tubes & techniques of delivery, Clinical uses & formulation, complications of enteral nutrition, Home Enteral tube feeding.
- Paediatric Enteral Nutrition.
- Parenteral Nutrition: Venous access, Nutrition formulation.
- Nutrition support in trauma & sepsis.
- Nutrition support in liver diseases.
- Nutrition support for the intensive care unit.
- Nutrition support in Respiratory Diseases.
- Nutrition support for surgical patients.
- Nutrition support in cancer.
- Nutrition support in HIV infection.

Suggested texts:

1. Antia P.P, Clinical Dietetics and Nutrition, 1989, 3rd edition, oxford university press
2. Robinson C, Lawler W.L, Chenoweth, A.E Garwick, 1986,Normal and therapeutic Nutrition, 17th edition McMillan Pub.
3. Mahan Kathleen L, Sylvia Escott Stump, 2001,Krause's, Food nutrition and Therapy, W.B. Saunders.
4. Williams S.R.1986, Essentials of nutrition and diet therapy, 4th edition, Morsby College Pub.
5. ASPEN; Nutrition Support, Dietetics
6. Pane Jason, 2001 Artificial Nutrition support in Clinical Practice.
7. Kirsby 2004, Practical hand book of Nutrition in Clinical practice.
8. Baker and Baker,1997 Pediatric Parenteral Nutrition, IT PUB
9. Pandya Sanjay, 2002, Practical guidelines on fluid Therapy, Bhalani Distributors

DD 3.4 PRACTICALS (1 unit - total 5 credits)

Objective: To impart practical training to the students in specialized dietary planning.

Course:

- Geriatric diet planning in health and diseases:
 - Assessment of the Nutritional Status.
 - Dietary planning during aging.
 - Dietary planning for aging related disorders.
- Dietary planning for sportsman:
 - Pre, during and post competition meal.
 - Carbohydrate super saturation.
- Enteral nutrition:
 - Dietary planning for:
 - Nutrition support in liver diseases.
 - Nutrition support for the intensive care unit, trauma & sepsis.
 - Nutrition support in Respiratory Diseases.
 - Nutrition support for surgical patients.
 - Nutrition support in cancer and HIV infection.
- Visits to commercial set up for enteral formula preparation and other food industries.

Suggested Text:

1. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders.
2. Williams S.R. 1986, Essentials of nutrition and diet therapy, 4th edition, Morsby College Pub.
3. ASPEN; Nutrition Support, Dietetics
4. Pane Jason, 2001 Artificial Nutrition support in Clinical Practice.
5. Kirsby 2004, Practical hand book of Nutrition in Clinical practice.
6. Baker and Baker, 1997 Pediatric Parenteral Nutrition, IT PUB
7. Pandya Sanjay, 2002, Practical guidelines on fluid Therapy, Bhalani Distributors

DD 3.5 PROJECT I (1 Unit - total 5 credits)

Objective:

- To train students in all aspects of executing a research project

Course:

- Selection of a topic
- Selection of study design
- Planning and implementation of the research project
- Data management
- Data analysis
- Report writing

SEMESTER IV (25credits)

DD 4.1 INTERNSHIP (25credits)

An internship program of six months duration, in order to expose students to the practical aspect of dietetics in an approved Government and Private hospital or institute or organization concerned with imparting dietetic counselling.

Objective:

- To impart practical knowledge in diet planning and patient counselling.
- To impart specialized knowledge therapeutic diets (like diabetes, cancer, heart diseases, renal disease, sports diets etc.)

Course:

- Case-studies
- Diet plans
- Discharge diet
- Report writing
- Case study presentations

Students will submit the final internship report at the end of fourth semester.