Placed at the meeting of
Academic Council
held on 26.03.2019

APPENDIX - C

MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)

Revised Syllabus for

One Year PG Diploma in Sanitary Inspector's Course (Semester Pattern)

Regulations, Scheme of Examination and Syllabus
(With effect from the Academic Year 2019–20)

Pre-amble:

One-year PG Diploma in Sanitary Inspector's Course is intended to give comprehensive and intensive training that would enable the students to be engaged in gainful employment especially with the government for the post of Sanitary Inspectors, Health Inspectors besides they can also work in the non-governmental and private sector in various departments of water, sanitation, health, nutrition, safety and first aid, departments. They will act as an active link between the community and the sanitation & health care system.

Objectives:

- To give complete knowledge and skill in Biological sciences to aid human life.
- To give complete knowledge and skills in Communicable diseases, Environmental sanitation.
- To give complete knowledge and skills in Behavioral Science & Health Education to help them be useful in society.
- To give complete knowledge and skills in Public Health Administration & Special Sanitation Problems, Public Health Acts to help them be useful in society,
- To give complete knowledge and skills in Food & Nutrition & National Health Programs to help them be useful in society.
- To record vital events, and to maintain reports, records and registers.
- To use computers and Sanitation / Health related softwares.
- To educate the community on Sanitation, Health, Nutrition and Hygiene.

Minimum Eligibility – Mainly a pass in B.Sc. Chemistry /Food technology / Nutrition Course from recognized Universities. Students of the science subjects namely Botany, Zoology, Bio-chemistry, Microbiology, Biotechnology and Physics can also be admitted.

Age: 20-35 years, The courses offered for both Male and Female.

Selection: Through personal Interview

Medium of Instructions: English

Duration of the course: One year -12 months (Semester Pattern)

Internship: 2 months

Employment Potential:

As a Sanitary / Health Inspector, the successful candidates will be more suitable for conducting surveys, reports, field work & research on various aspects of health, environment in WATSAN sector, Local Bodies. The core job remains to be professionals who shall supervise an assignment, conduct enough analysis when the need arises to make the people / company abide by the health standards in WATSAN sector department. Great opportunities exist in Government and private sector. The sector includes Local Bodies, Public Health Engineering Departments, Health Sectors, Railways, International airport, and NGOs engaged in health and WATSAN activities.

SYLLABUS FOR PG. DIPLOMA IN SANITARY INSPECTOR'S COURSE								Hours	Credits
	Scheme of Examination	**Maximum Marks**			**Minimum Marks**				
Papers	Subject Title	Internal	External	Total	Internal	External	Total		
FIRST SEMESTER									
Paper - 1	Human Anatomy and Physiology	25	75	100	NA*	34	50	100	5
Paper – 2	Medical Microbiology Entomology and Parasitology	25	75	100	NA*	34	50	100	5
Paper – 3	Epidemiology of Communicable disease, Non communicable diseases Prevention and Control	25	75	100	NA*	34	50	100	5
Paper – 4	Environmental Sanitation and Hygiene	25	75	100	NA*	34	50	120	4
Paper – 5	Behavioral Science and Health Promotion and Education	25	75	100	NA*	34	50	100	5
Paper – 6	Practical – I	40	60	100	NA*	27	50		2
Paper - 7	Practical – II	40	60	100	NA*	27	50		2
FIRST SEMESTER TOTAL		700			350			520	28

SECOND SEMESTER									
Paper - 1	Food and Nutrition Program, Reproductive Child Health and Family Planning	25	75	100	NA*	34	50	100	4
Paper – 2	Public Health Administration, National Health Programs and Vital Statistics	25	75	100	NA*	34	50	130	4
Paper - 3	Special Sanitation Problem, Public Health Act.	25	75	100	NA*	34	50	100	4
Paper - 4	Environmental Science, First Aid and Disaster Management	40	75	100	NA*	34	50	100	4
Paper – 5	PRACTICAL – I Environmental Science and First Aid	40	60	100	NA*	27	50		2
Paper - 6	Field Training and Industrial Visit: Concurrent Field Training (CFT) and Field Observation Visits	40	60	100	NA*	27	50	100	2
Paper - 7	Supervisory Field Training (SFT)- Project and Viva Voce		100	100	NA*	50	50		2
TOTAL SECOND SEMESTER		700			350			530	22
GRAND TOTAL		1400			700				50

NA* : (Not Applicable). However, the internal is mandatory.

First Semester - Paper 1
Human Anatomy and Physiology

Objectives: To enable the student to understand the elementary structure and function of various systems of human body.

Unit – I : Blood and Circulatory Systems: The Cardiovascular System (Parts of the system, Cardiac cycle and General Cycle) The Cardiovascular System (Different circulation and blood pressures), Blood (Composition, Functions of the Blood, Different types of Blood cells)Blood (Blood Cells Functions coagulations blood groups).

Unit – II: Digestive and excretory systems: Anatomy and functions of digestive systems – Oral cavity, stomach, small intestine, large intestine, pancreases, liver, Saliva composition, absorption and assimilation. **Excretory systems-** excretory organs, locations, structures and functions, urinary tracts urine formation and composition of urine. structure and function of kidney.

Unit – III: Skeletal, Muscular and Nervous Systems: Cell and Tissues, The Skeletal System-classification and structure of bones classification and movements of joints, The Muscular System Muscles of head Face, Neck, Shoulder girdle, upper limp thorax, Muscles of back, Pelvis the Nervous Systems, Spinal Card, Reflect action, Autonomous Nervous Systems Sensory Organs, Eye, Nose, Ear, Skin, tongue. Structure and function of Brain Cerebrum, Cerebellum, Medulla oblongata. Structure and function of Spinal cord. Function of Autonomic nervous systems. Reflex action-reflex arc.

Unit – IV: Respiratory systems: Anatomy - respiratory pathway, lungs unit Lungs, Mechanism of respiration Gas exchanges in tissues, transport of O2 and CO2. Artificial Respiration- Types-Mouth to Mouth, Schafers method, Holger Neilsons method, Drinker's mechanical method.

Unit - V : Reproductive and Endocrine systems: Anatomy of male and Female reproductive organs- Menstrual cycles, process of reproduction and lactation, conception and contraception. Structure and function of Pituitary, thyroid and adrenal glands.

Reference Books

1. Evelyn Pearce, **Anatomy & Physiology for Nurses,** Jaypee Brothers, 16th Edition,1993.
2. Anne Waugh / Allison Grant, **Anatomy and Physiology in Health and Illness,** Churchill Livingstone Elsevier 2007.
3. Gosling, **Human Anatomy (colour Atlas and Textbook)**5th edition 2002.
4. UNEP/ILO/WHO, **Guidelines for Poison Control,** WHO, Geneva1999.
5. B.D. Chaurasia Human **Anatomy - Upper Limb & thorax** (Vol. I)CBS Publishers & Distributors, 4th Edition, 2005.
6. B.D. Chaurasia Human **Anatomy - lower Limb abdomen & Pelvis** (Vol. II) CBS Publishers & Distributors,4th Edition, 2005.

7. B.D. ChaurasiaHumanAnatomy - **Head, Neck & Brain** (Vol. III)CBS Publishers & Distributors, 4th Edition, 2005.
8. Inderbir Singh, **Atlas of Human Anatomy**,Jaypee Brothers1st edition, 2003.
9. Churchill Livingston **Anatomy and Physiology in Health and Illness**, 9th Edition, 2004.
10. Murugesh N Anatomy Physiology and Health education, Sathya publishers Madurai, 6th Edition, 2010.
11. S.Subramanian and S.M.Kumar ,Text book of Physiology , Orient Longman ,1971

First Semester – Paper 2

Medical Microbiology, Entomology and Parasitology

Objective: To enable the student to understand microorganism related to health, its Classification- identification and control and the role of insects in transmitting diseases and its control measures and parasites of human being that infect on the host.

Unit – I: Medical Microbiology : Definition and Scope of Microbiology. Historical development of the Field Microbiology-Louis Pasteur, Edward Jenner, Robert Koch

Alexandar Fleming, and Ronald Ross. Introduction of bacterial, Viral, Fungal and other disease caused by microorganisms.

Study of various Microscope -Simple, Compound, Electron, dark field.

Stains and staining - Principles of staining, simple staining, negative staining, differential staining, Gram and acid fast staining, flagella staining, capsule and endospore staining. Classification, Structure and reproduction of microorganism.

Control of microbes - Sterilization, disinfection, antiseptic, tyndallisation, pasteurization: Physical- dry heat, moist heat, UV light, ionizing radiation, filtration, HEPA filter, Chemical- phenol and phenolic compounds, (halogen aliphatic alcohol, formaldehyde, ethylene oxide, heavy metals) anionic and cationic detergents.

Growth of bacteria - Definition, growth phases, kinetics of growth, direct and indirect measurement of growth, factors affecting growth (pH, temperature, oxygen).**Air microbiology** -Microorganisms in the air, sampling techniques, air borne pathogens(sewage), BOD, COD (definitions), general outline of water treatment. **process:** septic tank, sedimentation Activated sludge and trickling filter process.

Important water borne diseases– cholera, typhoid, (name of pathogen, preventive measures). Outlines of method for detection of microorganisms in drinking water (presumptive, confirmatory and completed tests Distinction between fecal and non-fecal coliforms, IMVIC tests.

Unit – II Food microbiology -Microbial flora of fresh foods: Milk as a growth medium of bacteria, normal micro flora of milk, undesirable microorganisms in milk and normal micro flora of meat, poultry, eggs, fruits and vegetables Microbial spoilage of food- Fresh food, fresh milk, canned food and stored grains, Food poisoning, Food Borne infections.

Microbiological examination of food: microscopic examination and culture, phosphatase test of Pasteurized milk.

Preservation of food - High temperature (boiling, pasteurization, appertization), low temperature (freezing), dehydration, osmotic pressure, chemical preservations, radiation. Study of different causative agents of diseases: Bacteria, Fungi and Virus

Unit – III: Immunity and Immunization: Immunity active, passive, immune response antibodies, primary, secondary immune response, hypersensitivity, allergies, Vaccines, sera, Immunoglobulin Trypanasomagambiense, Giardia. Trichomonas, Balantidium coli, Echinicocusgranulosis.

Unit– IV: Medical Entomology: Introduction - Classification of insects-definition of metamorphosis, vectors, main and intermediate host. General characters of mosquitoes and different types. Public health importance, life cycle of Anopheles, Clues, Aedes, Monsioniamosquito, important species and control measures. Legal measures of mosquito control, integrating vector control with primaryhealth care promotion Morphology, life cycle and public health importance of -Sandflies, Cyclops, housefly flea, rates, bedbug, louse, ticks, mites, Tsetse fly-leishmonia-tryponasomagambiense, Giardia lamplia, Trichomonushominis, balantidium coli, Trematoda, Cestoda, Namatoda.

Unit - V : Parasitology: Parasitological blood parasites- Malarial parasites, Filaria, Endamoebahistolytica, helminthes- Life cycle and morphology of hook worms and pin worms, tape worms Guinea worms, Dracanculusmedinensis, Wouchereriebancrafti and Brugiamalayi. Different developmental stages in the life cycle skin parasite: itch mite morphology and life cycle.Trypanasomagambiense, Giardia. Trichomonas, Balantidium coli, Echinicocusgranulosis

Reference Books

1. Judith Collier/Murry/peter Scally, **Oxford Handbook of Clinical Specialties,** Sixth Edition, Oxford University Press,2003
2. K.D.Chatterjee, **Parasitology, Protozoology and Helminthology,**12th Edition 1997.
3. WHO/Geneva, **Basic Malaria Microscopy** - Part II Tutor's Guide, WHO, Geneva1994.
4. MC Gupta / BK Mahajan, **Textbook of Preventive and Social Medicine,** Jaypee Brothers3rd Edition, 2005.
5. Chandler and Reid, Introduction to parasitology.
6. Chatterjee, Introduction to parasitology.
7. Public Health and preventive Medicine – Bedi.

8. K. Park, Park's Textbook of Preventive and Social Medicine, Banarsidas Bhanot, 25th Edition, 2018.
9. Kanai L. Mukherjee, Medical Laboratory Technology, Tata McGraw-Hill PCL2 (3 Vol) 2007.
10. Text Book of Microbiology Ananth Narayan & Panikar
11. Field Public Health Entomology Field Training guide S. G. Jagadeesh, 2015.
12. Modern Entomology D.B. Tembhare, 2013, Himalaya Publishing House.
13. Text book of Entomology, Md. Sulaiman, Himalaya Publishing House, 1992.
14. Text book of Entomology and elementary Parasitology, G.K. Rathinaswamy.

First semester- Paper 3
Epidemiology of Communicable Diseases, Non Communicable diseases, Prevention and Control

Objective: To have an understanding of: Communicable diseases & its Classification 2. General methods of prevention and control of Communicable disease; and Non communicable diseases.

Unit – I Classification of Communicable Diseases: According to Causative agent, according to Methods of communication, Factors: Essential for development of infectious process. Host parasite environmental relationship in transmission of any communicable disease.

Unit – II: General principles of control of communicable diseases: Increasing resistance of new host. Minimizing ill effects of cases that have not been prevented. Control of Communicable Diseases in Schools Schematic Study of communicable diseases. Essential factors to development communicable diseases: Identification, occurrence, infective agents, reservoir and source of infection and mode of transmission incubation period, period of communicability, susceptibility and resistance, immunity, preventivemeasures, control measures of various communicable diseases. Definition and meaning of the words communicable and non-communicable diseases Infectious disease, host parasites, environment general methods of control epidemiology, legal basis of communicable diesis control.

Unit- III: Intestinal Infections: Cholera, Diarrhoeal Diseases, ORS preparation- Management Typhoid, Dysenteries, Polio, Infectious Hepatitis, Roundworm, Hookworm, Guinea worm, Tapeworm, food Poisoning.

Respiratory Infections: Epidemiological factors that helped in eradication of small pox, Chickenpox, Measles, Mumps, Diphtheria, Whooping Cough, Tuberculosis, Viral Infections like Birds' flu, swine flu, influenza, Viral Infections like Birds' flu, swine flu, influenza

Arthropod infections :Malaria, Filariasis, Dengue, Chickungunia Kala Azar, Plague, Japanese encephalitis, Scabies, pediculosis, Guinea worm disease, Zika, Yellow fever.

Zoonosis: Rabies Protective Measures, , Plague, Japanese encephalitis, Anthrax, Rickettsial diseases, KFD, Brucellosis diseases Nipha Swine flu.

Surface Infections: Scabies, Tetanus, Leprosy, Trachoma, Pediculosis. **Control** of Sexually Transmitted Diseases, HIV/AIDS & Hepatitis B.

Unit – IV: Non communicable Diseases: Control of infectious diseases, Parasitology, viral infections, hospital infections, immunology of infection. Epidemiology and control of infectious diseases in developing countries for individual diseases like Aids, tuberculosis, Malaria, Communicable disease control. Environmental epidemiology. Disinfection and Disinfectants, Food microbiology, water and sanitation, diagnostic methods, Environmental sanitation, for water, air, solid waste disposal, liquid waste disposal, night soil disposal, burial or funeral grounds, soil sanitation, housing, sanitation measures in fairs festivals, and natural calamities- mass casualty disposal. Personal factors in Public Health, certain basic principles of supervision Supervisory responsibility

Reference Books

1. K. Park, Park's Textbook of Preventive and Social Medicine, Banarsidas Bhanot, 25th Edition, 2018.
2. S. Kamalam, **Essentials in Community Health Nursing Practice**, Jaypee 2005.
3. Joydeep Das Gupta, **Hospital Administration and Management - A Comprehensive Guide** Jaypee 2009.
4. P.K. Dave et.al. **Emergency Medical Services & Disaster Management - a Holistic Approach** Jaypee Brothers 2008.
5. Parthasarathy, **Immunization** Digest Jaypee 2005.

First Semester - Paper 4
Environmental Sanitation And Hygiene

Objective: To have an understanding of man's physical environmental factors in relation to health and sanitation. Students to have an understanding of Factors that influence the behaviors of people Various tools available for educating the people about health.

Unit – I: Environmental Sanitation: Rural Water Supply-Small-scale: Water & Health - Sources of water and their characteristics (Rain water - surface water, ground water) - Diseases transmitted through water and channels of transmission of infection - protected water supply - Estimating the quantity of water required by a community wells as a source of water supply for rural areas - selection of site for a well - Classification of wells – renovation of citing of wells - Study of Various types of hand pumps - Infiltration galaxy - Pond water supply - Disinfection of water supply - water quality collection of water samples.

Unit – II: Urban Water Supply- Large scale: Components of Urban water supply system - Difference between a pumped system and a gravity system - Different types of treatment (Aeration, Sedimentation Rapid & Slow sand filters, Disinfection, PH adjustment, etc.,) Fluoridation and de fluoridation - Domestic treatment of water - duties of a Sanitary Inspector in relation to water supplies – Desalination.

Unit – III: WASTE MANAGEMENT: Excreta Disposal: Public Health aspects of Excreta disposal - requirements of a Sanitary Latrine - Selection of site for latrines - Public & Latrines and their constructional features - Travel of pollution from latrine pits. - Organization of Latrine Programme in Rural and Urban area - Low cost sanitation programs, Disposal of Fecal sludge Different types of latrines and public health importance.

Unit– IV: Refuse collection and Disposal: Definitions - Collection and Disposal of Rubbish various methods - (Dumping, Composting, Incineration, Sanitary land fill), Disposal of biomedical and Plastic wastes - waste recycling - Planning for refuse collection & Disposal.

Disposal of Dead: Need for proper disposal, various methods, burning, burial, committal to sea or river, Silent Tower, electric cremation - Public health aspects – emergency disposal during.

Unit – V: Waste water Disposal: Public Health Importance and methods of disposal of waste water - What are liquid wastes - situations that a sanitary inspector will come across in waste water disposal Different methods. - Soak pits, Seepage pit - dispersion trench kitchen garden drawings etc.

Drains: Construction - Different types of drain - Methods disposal of drained water.

Unit– VI : Sewerage: Object of sewerage - Definition of terms types of sewers, Bod,Cod-sewer appurtenances - sewer maintenance and precaution to be taken by cleaning crew sewage treatment primary, secondary etc., Oxidation pond, sewage farm - trickling filter - imhoff tank.

Plumbing: Various fixtures used in plumbing - scope of plumbing – water system waste system - cross connections in plumbing - tools and materials used in plumbing.

Hygiene: Personal Hygiene: Skin care, cleanliness, clothing, care of the hair, prevention of pediculosis, Dental care and oral hygiene, care of nails, hand washing and its importance, toilet hygiene, Mental hygiene, Menstrual hygiene.

References

1. S.L.Tripathy & Sunakar Panda, Fundamentals of Environment Studies, Vrindha Publication, 2005.
2. R.K.Jain/ Sunil S.Rao, Industrial Safety, Health and Environment Management Systems,Khanna Publishers, Delhi 1st edition,2006.
3. AM Michael, SD.Khepar, S.K Sondhi, Water wells and Pumps, Tata McGraw- Hill PCL 2008.
4. Jayshree Suresh/BS Ragahavan, Professional Ethics, S.Chand& Company, 1st Edition, 2005.
5. N.Vasudevan, Essential of Environmental Science, Narosa Publishers House, 2006.
6. K.Park, Essentials of Community Health Nursing , Banarsidas , Bhanot, 5th edition 2008.

First Semester - Paper 5

Behavioral Science, Health promotion and Education

Unit – I: Introduction to Behavioral Sciences and Health Promotion Factors affecting Health behaviors, Inborn and acquired characteristics, Characteristics of Rural and Urban Community. Characteristics of Rural and Urban Continuum.

Unit – II: Teaching and Learning -Communication process andpreparation of audio visual aids Teaching - Learning- Learning situation–Principles of Adult learning- Learning theory- Kurt Lewin-Kelman .

- Educational methods- Individual Contact/Family visit – Groupdiscussion - Lecture discussion, Demonstration, Work- shop, Paneldiscussion- Role play- Case study- Campaign.
- Adoption- Diffusion - Stages - Roger's Model-Classification of adopters.
- Motivation-Kurt Lewin-Force Field analysis- Rosen Stock Principles of Motivation.
- Communication-Characteristics - Principles –Overcoming barriers in communication Types-Interpersonal and Mass communication.
- Rumour –process- Checking of rumours
- Behaviuoral Change Communication Model - IEC- Information – Education-Communication-strategy- in health care delivery.

Counselling- steps- qualities of a counsellor Definition - Concept - Objective – Principle, Role of health education in Health Promotion.

Unit – III: Community: Definition - importance of studying of community for health promotion. Dimensions of community - population characteristics social stratification Characteristics - of Rural and urban community Customs - Norms - Values systems - Attitudes - culture Folkways – Mores and its role in Health behavior.

Social Institutions - Government - Family - Religion. Education - Economic system Group - Formal and informal group. Organization - Mathar Sangam - Youth Farmers – Club.

Unit – IV: Principles of Communication: Field black smiths, Barbers - Tradesmen, etc.

For one village to other - Newspaper - Radio - Gathering at Market, Melas, Wedding, Festivals, Relatives. Power structure - Definition of leader - source of leader - Type of leader - Functional types - working through community leader.

IEC- Media (Audio visual aids) –Definition–Media–Mass Media – Audio Aide; Visual Aid–Importance of aids – specific importance of mass media – classification of audio visual aids, films, T.V. – film strips – flash card – flannel graph – poster – pamphlet and leaflet.- Practical – preparation of simple aids – flash card or flannel graph and handling of TV and video – slide project - Community organization – definition – nature – concepts and basic assumptions.- Principles and process of community participation.- Importance of community organization and community participation – Participatory Learning for Action (PLA).

Unit – V: Community Participation: Learning process Definition – Factors affect learning – principles of learning - Adult learning Adoption process - stages of adoption process - types of adopters Motivation - definition - principles of motivation process. Communication - definition - process, elements and principles of communication - Interpersonal and Mass communication serial communication - Rumour.

Unit – VI: Programme Planning: Objective Programme Planning – Definition – Steps in Programme Planning Survey to collect information essential for planning – method of collecting information source of information in the community – rapid survey and how to conduct it. Participatory Learning for Action. Establishment of objectives.

Health Education: Definition, -Concept –Objective –Principle .Role of health education in Health promotion. **Assessing barriers to Health education:** ,Identifying Resources organization – personnel – material and equipment for the educational phase of the Programme –funds. Felt needs and setting priorities. Selection of community for work – Need for the Selection of Community for work – Criteria for selection of responsive communities Planning the programme concerned Government Agencies and people. - The plan of action should be developed. Need for planning people's representative. -Suggested role responsibilities. Planning and carrying out programmes at community level – general – administrative educational activities in community level involving people in organizing.

Unit - VII : School Health Promotion: General importance of School health education, Elements of school health Programme. School health education in relation to community, Suggested steps in organizing a school health education. School health education in relation to community, Suggested steps in organizing a school health education. How to involve the school in a community health education Programme, Suggested routine health education activities in school. Health education opportunities in the primary health center. Health education in fairs and festivals and celebration of National Days.

Evaluation: Definition of evaluation–purpose of evaluation -objectives of evaluation – types of evaluation – steps in evaluation. Sustenance of Programme at village level. Report – purpose of report. Characteristics of a good report. How to prepare and write a report. Types of report. The organization and form of a report and budget preparation.

Concurrent field visit

- To conduct community health survey and analysis
- To identify the leaders in a community
- To conduct Group discussion and Demonstration in a community.
- To apply PLA techniques in a community
- Visit to community/ICDS center,/ school to conduct health education

References

1. Keval J. Kumar, Mass Communication in India, Jaico Publishing House, 32nd Edition, 2008.
2. A Text book on health education by Dr. Dharmalingam and Dr.L.Ramachandran. GIRH& FWT Gandhigram.
3. K.Park, Essentials of Community Health Nursing , Banarsidas , Bhanot, 5th Edition 2008.

4. K.Park Park's Textbook of Preventive and Social Medicine BanarsidasBhanot 25th Edition 2018.
5. Public Health Engineering by GS Bajwa.
6. Waste Water Engineering, Treatment and Reuse by Metcalf and Eddy, 5th Edition, Tata McGraw Hill.

First Semester- Paper 6
Practical – I

Practical Anatomy and Physiology

The student will be able

- To locate anatomical position of the body and important organs.
- To identify bones and joints in the human body . To identify the blood cells (TC, DC) to measures the HB level.
- To identify the blood samples investigation and transportation
- To measures visual acuity using snellen's chart.
- To detect sugar albumin in the urine.

First Semester - Paper 7 - Practical – II
Practical Microbiology, Medical Entomology Parasitology and Communicable Disease Control

1. Practical Parasitology:

- Preparation of thick and thin blood smear
- Demonstration of Helminthes worms
- Demonstration of motion test to see the ova or egg of intestinal worms
- Demonstration protozoan parasites.

2. Practical Entomology

- Collection of mosquitoes, different stages egg, larva, pupa and adult.
- Identification of them under microscope
- Different insecticides used in control
- Different sprayers and demonstration of spraying techniques
- Collection of cyclopes and identification under microscope
- Collection of various stages of fly- identification of them under microscope.
- Identification of different species of flea, survey and demonstration
- Identification and de lousing operations
- Identification of ticks and mites under microscope.

3. Practical Microbiology

- **Microscope** - Demonstration of various parts of Simple and Compound Microscopes
- **Sterilization** - Operation of autoclave, hot air oven, membrane filtration (demonstration only), room fumigation using formalin, surface sterilization by phenol.
- **Culture media preparation** -Nutrient broth, nutrient agar slant, potato dextrose agar.
- **Aseptic techniques** -Culture transfer from solid to solid, solid to liquid and liquid to liquid: Checking of possible contamination.

- **Culture techniques-** Streak plate, pour plate and spread plate (stab culture only demonstration)

Isolation of pure culture by streak plate method. Viable count of bacteria by serial dilution and pour plating. Bacteriological examinations of drinking water (presumptive, confirmatory and completed tests). Turbid metric measurement of bacterial growth (colorimetric measurement of OD versus time).

Staining techniques –Gram staining, spore staining and Acid Fast staining Sputum staining, Identification of gram positive ,gram negative and acid –fast bacilli under the microscope, Identification of various disease causing organisms with their description

Communicable Disease Control: Diarrheal diseases and ORS preparation and management, Practical related to the following illness : Tuberculosis, Malaria, Leprosy infection, Plague Cold chain maintenance, inoculation / immunization practice, Visit to infectious disease hospitals ,radical treatment –Malarial drugs , Demonstrate methods of tuberculin testing, reading reaction and BCG inoculation of negative reactor –Visit to TB Hospitals. Visit Infectious disease hospitals, radical treatment –malarial drugs. Visit to leprosy hospital to study the case identification program. Epidemiological study of epidemics

Second Semester - Paper -1
Food and Nutrition Program and Reproductive Child Health and Family Planning

Unit – I: Introduction to Public Health Nutrition: Concept of Nutrition and Health – adequate Nutrition, Malnutrition. Basic elements of foods- Proximate principals and protective foods. Food groups and their Nutrient contribution. Nutrients required for a balanced diet, recommended daily food requirements for a balanced Indians diet. Factors influencing Nutrition Balanced Diet for different age and sex groups including vulnerable groups planning a low-cost balanced diet, dietary requirement for certain diseases and for convalescents, geriatric nutrition. Problems of malnutrition common in India and their prevention. Interaction of nutrition and Infection, Nutrition and Family Planning. Food Borne Diseases and food hygiene. Food Adulteration, Introduction to food safety and standards. Consumer production Acts. FSSAI, AGMARK, ISI. Assessment of the nutrition status of the community nutrition and diet surveys (Theory).

Unit – II: FAMILY WELFARE & POPULATION EDUCATION: Introduction What is Family planning? Population growth of India and the world Need for Family Planning Individual reasons family reasons community reasons. Social and Economic implications of population growth in India. Anatomy of the Reproductive System. Physiology of the Reproductive System. Barriers to Family Planning Cultural and social barriers Administrative Barriers. Eligible Couples in family planning methods of Family Planning. Extended Family Planning Programme Operational Organizational set up Duties of personal.

Unit – III: REPRODUCTIVE CHILD HEALTH/ NRHM: Reasons for special attention in the vulnerable groups. Maternal Mortality, Predisposing causes. Infant Mortality: Pathological causes Predisposing causes Natal Service and Its Objectives Post- natal service and its

objectives infant and pre-school Programme Pre- School Health Programme Organization of maternal and child health services.

Unit – IV: SCHOOL HEALTH SERVICE: Function of School Health Service Measures for Promoting positive health which should include. Reasons for the special consideration of the group. School Medical Inspection Control Of communicable Diseases Immunization School Sanitation School Meal Programmes Health Education in School Need of health education in schools Health education at home. Health education at Community Level.

Reference Books

1. A.M.Chalkley, A Textbook for the health worker, New Age International Publishers, 2008
2. Dr.M.Swaminathan, Hand Book of Food and Nutrition, The Bangalore Press,2006
3. A.S Narasimhan S.Mohammed Shabeer Manual of Tamilnadu Acts and Rules(Civil, Criminal, Labour and Revenue) Deccan Publications 2007.
4. S.P.SenGupta,Indian Trusts Act Kamal Law House 4th Edition, 2009.
5. Dr. NirajKumar Bharat's Treatise on Right to Information Act Bharath law House,2nd Edition,2005 2009.
6. Dr.Awasthi, The Constitution of India Dwivedi Law Agency,4th Edition, 2008.
7. K.S Mahalingam, The tamil Nadu Panchayats Act, C. Siteraman&Co Pvt.Ltd, 1994, 2007.
8. K.J.AiyarJudicial Dictionary, Bufferworth India,13th Edition,2001
9. P/K Majumdar,law Of Consumer protection in India, Orient Publishing company,5th Edition,2009
10. Dr.S.B.N. Prakash, Mental Health & Law, Lawyaer's Law Book.
11. B.Vijayakumar, The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation)Act 1995, C. Sitaraman & Co. Pvt. Ltd., Edition 2006.
12. Prevention of food Adulteration Act 1954 with prevention of food Adulteration Rules,1955 Law Publishers(India)Pvt. Ltd. Edition 2008, 2nd Edition.

Second Semester - Paper 2
Public Health Administration, National Health Programs and Vital Statistics

Objective: Students to have an understanding of 1. Public Health Administrative set up in national-state-district PHC, 2) Laws to be educated at various levels, 3) Importance of birth and death registration, 4) Nutrition and health, and 5) Mother and child health.

Unit – I: Introduction of Public Health: Administration – Definition of Public Health – scope of Public Health Activities – Definition of Administration and Public Health – Administration – Difference between Therapeutic Medicine, Preventive Medicine and Public Health. Historical Development of Public Health in India: Public Health in ancient India; Public Health in British days; Public Health in India after Independence; Public Health Development of Tamil Nadu State Health Problems in India compared with other developed countries: What is health problems? Magnitude of health problems in India. Health problems in India compared with other foreign countries.

Unit – II: Health services: Board Committee report and major recommendation. The Mudaliar committee reports, conducting of village health services. Organizational consideration in public health Component functions involved in public health Definition of organizational and purpose of organization; General principles of organization; Levels of organization; Organizational structure; Decentralization; Coordination Personal factors in Public Health and Supervision Personal factors in Public Health, certain basic principles of supervision. Supervisory responsibility.

Unit – III: Programme Planning and Evaluation: Principles of Programme Planning; Steps in Programme planning Evolution, Method of evaluation Present organisation public health control level Union ministries responsibilities, Setup and organization of the union ministry of health. Organization and functions of the state ministry of health Organisation and functions of the District Health Office Duties of the District Health Officer, Setup of the District Health organization. Health facilities in urban area, Definition of urban area-corporation, municipalities and town panchayats ;organizational setup for public health in corporations, organizational setup for public health in municipalities and duties of the various public health personal. Organizational setup for public health in town panchayats and duties of the various public health personal; Duties of a Sanitary Inspector in urban area.

Unit – IV: Primary Health Centers: Background and justification and development; Principles behind the establishment of Primary Health Centre ; Setup and function; Duties of different personnel with special reference to that of a sanitary inspector; Budget for a primary health centre ; Team work within the staff of the PHC and also with that of the Community Development; Record keeping and reporting at the PHC level . Re organized patterns of PHC-Integration of malaria maintains and family planning with general health services-functions of the various personal in the reorganized pattern.

Unit – V: International Health organizations and National Health

Programs: World Health Organization(WHO), functions of WHO, approach in control of disease, WHO assisted projects in India, UNICEF,FAO,ILO. Objectives and organization-Categories of aid- UNICEF assisted projects in India-Colombo plan-TCM are US Aid –Ford Foundation- The Rockfeller Foundation. Public Health laws - Definition of law – characteristics of law –Public health law-Act- Central Act- State Act- Rule- Bye Law- Standing Order- Need for public health law Statutory laws for normal conditions and epidemics public health practices covered by law Law for normal conditions –Law applicable to epidemics- Medical relief and public health measures-Sanitation- General.

Unit – VI: Priority in dealing with the health problems: What is priority? –Need for priority for establishment for public health programme-Priority for health programme in the five year plan-Priority for programmes in environmental sanitation.

Voluntary agencies - their functions and activities.

The Five year Plans: What is a plan ?-Health schemes provided in the five year plan-

Expenditure in health in the five year plan-Achievements of the previous plan period- Budgeting.

Unit – VII: VITAL STATISTICS AND BASIC COMPUTER

TRAINING: Introduction - To Enable the student to have an understanding on the terms like statistics and Bio-Statistics and their applicably and relation to public health. Vital Statistics to enable the students to have an understanding. Registration Importance of V.S Registration. Defects in this System. Introduction - To Enable the student to have an understanding on the terms like statistics and Bio-Statistics and their applicably and relation to public health. Vital Statistics to enable the students to have an understanding. Registration Importance of V.S Registration. Defects in this System. Specific Methods of improving the system etc. Averages: Mean, Median, Mode Indices in Health: What is Health? Indices for measurement of health mortality and morbidity Census and Population: Understanding of census – Problem in V.S rates-Like CBR, CDR, IMR, MMR, NMR, FR, Vital index etc

Acts: Various acts-PH Act 1939, Factories act 1948 PF Act 1956 and So On.

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1 Lloyd F.Novick, Cynthia B.Morrow "Principles for Population based management Jones and Bartlett Publication 2008.

2 Seal , S.C "Health Administration in India, Dawn Books, Calcutta 1975.

3 Geal, S.L "Public Health Administration "New Delhi, Sterling Publication Privates, 1984.

4 K. Park, Park's Textbook of Preventive and Social Medicine, Banarsidas Bhanot, 25th edition, 2018.

Second semester- Paper 3
Special Sanitation problems and Public Health Act
SPECIAL SANITATION PROBLEMS

Objective: Students to have an understanding of the occasions and placeswhere special sanitary arrangements needed.

Unit – I : 1. (a) Housing (b) Village and Town Planning: Housing : Relationship of housing survey of houses – smokeless Chula etc. types of houses – basic principles of villages and town – existing and new master.

Unit – II: 2. Food and Milk Sanitation: diseases transmitted through food– classification of food borne diseases – infection and poisonings. Essentials of food establishments – production of food from insects, rodents etc. – dangerous chemicals involved – utensils used washing and sanitizing vessels – food handlers classes – sample collection etc. – introduction of food establishing – slaughter house – markets (Vegetables, mutton, and fish) Bakery, aerated water etc., - milk borne diseases – pasteurization, dairy inspection of cattle shed etc.

Unit – III: 3. School Sanitation: As a part of an overall school health programme – importance selection – location – standards of lighting – arrangement of class room – Furniture – water supplies – drainage – refuse collection and disposal – factories etc.

Unit – IV: 4. **Industrial sanitation and Occupational Health:** Industrial hygiene in relation to health – Engineer safety – occupational hazards plant sanitation – building toilet facilities – water supply – ventilation separation of process – refuse collection and disposal factories etc.

5.**Camps – Fairs and Festivals:** Classification of fairs and festivals – objectives of public health arrangements preventive measures to be made, in relation to lay out of accommodation, lighting, water supply, conservancy – food control, medical relief and isolation, immunization, staff finance reporting of festivals, enroll arrangements N.C.C camp, Scout camp. Refuge, evaque camps.

6. Institutional Sanitation: Sanitation of a training Centre–evaluation – hospital sanitation etc.

Unit – V: 7. Places of public resorts: Cinema house, barber shops, Dhobikhana, laundry, swimming pool etc.

Unit – VI: Public health Acts: Public Health Act , Mosquito Control Regulations, Public Health (Slaughter of Animals) Regulations, Private Hospitals And Nursing Homes(Registration Control) Regulations, Public Hospital Regulations, Schedule of Fees, Community Health Services Regulations, Public Health (Collection And Disposal of Refuse) Regulations, Building And Sanitary Regulations, Infectious Diseases (Equine Encephalomyelitis) Regulations, Infectious Diseases (Prevention) Regulations. Chlorination of water source (at various levels) and testing of the residual chlorine every half-an-hour and plot; good and bad aspect of chlorination. Hydrogen Ion Concentration. H-ion concentration, Determination of pH, Litmus paper, pH paper disc, with practical demonstration, Indicator Solution Calorimetric method etc, Analysis without indicator.

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3. Dr. Niraj Kumar Bharat's Treastise on Right to information Act Bharath Law House, 2nd Edition, 2005, 2009.
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10. Rights and Full Participation) Act 1995, C. Sitaraman & Co. Pvt. Ltd, Edition 2006
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16. Khanna Publishers, Delhi, 1st Edition, 2006.
17. Benny Joseph, Environmental Studies, The McGraw Hill Companies, 2nd Edition, 2009.
18. **First Aid** St. John's Ambulance Manual of First Aid by Gupta, L.C & Gupta, A., Jaypee Publishers First Aid and Emergency Nursing by Yalayyaswamy, N.N. CBS Publishers.

Second Semester - Paper - 4
Environmental Science, First Aid and Disaster Management

Unit – I: Environmental Biology: Brief history of General Microbiology, Morphology of Bacteria. Filamentous Bacteria, reproduction of bacterial Nutrition of Bacteria, chemical composition of Bacteria, Respiration of Bacteria, Effects of Environments on growth of Microorganisms, Main ways of infection Spreading, Indicating Role of Escherichia coli, Biological Factors of Water self-purification. Technical means of controlling Microbial population in water, Microbiology of drinking water and sewage. Phytoplankton, Zoo plankton, Infective forms of organisms present in water, N2 transformation by bacteria, Iron manganese bacteria. Life of Microorganisms in water supply systems and sewerage treatment plants. Sewage/Fertilizers/Algal/Oxidation goods. Aerobic treatment of Sewage, Anaerobic Treatment of Sewage, Sludge Treatment Equipment. Discharge of Sewage into sea, Sewage Fertilizers. Their effect on Ecology system, designs, functions of stabilizing ponds/Oxidation goods. Definitions and application of the concepts in Public Health Osmosis, Diffusion, Flocculation, Coagulation, Colloidal solution, Capillary permeability, dehydration, Electrolysis, Surface Tension Specific gravity, Relative density

Unit – II: Environmental Chemistry: Concept and scope of Environmental chemistry, Environmental segments. The oxygen cycle, the Nitrogen cycle, the phosphate cycle, the Sulphur cycle. Atmosphere: Oxygen and ozone chemistry, Sulphur dioxide, Nitrogenoxide, Organic compounds, Greenhouse effect /Global Warming, Ozone hole, Carbon monoxide, Nitrogen oxides, Sulphur dioxide, Acid rain, Radioactivity, Instrumental techniques for air pollutants, Hydrogen Sulphide, Aerosol, Asbestos dust. Water Pollution-Organic pollutants, Inorganic pollutants, pesticides, Monitoring techniques and methodology, ph, Dissolved oxygen, Total hardness, Chemical oxygen demand, Biochemical oxygen demand, tannin and lignin, Escherichia coliform and total bacteria. Water and aqueous solution: Water, the theory of solutions, General properties of Solutions, Fractional Distillation Acidity and Alkalinity of Solutions, Buffer Electrolytic Dissociation of water, Hydrolysis of salts, Hydrolysis of Chlorine. Characteristics of Natural Water, Water pollutants, chemical analysis of natural water, requirements for water quality, summary of procedures for analysis of water quality parameters. Processes in water purification for small communities. Removal of course suspended particles, coagulation, disinfection of water, determining the stability and aggressiveness of water, corrosion of metals, action of sea water on concrete, removal of gas from water, removal of smack and odour from water. (De-odoration),Softening and Desilting of water, Acidifying, Removal of Iron, Manganese, Silica and Fluorine from water, Purification of waterfrom radioactive substances, Magnetic treatment of water, De- fluoridisation Techniques and Iron removal-Minerals water etc. Water pollution: Algal blooms, Eutrophication, detergents, industrial pollution, chemical pollutant, industrial disposal, environmental pollution by pesticides, oil spills.

Unit - III : Food Chemistry : Introduction: What is food chemistry? History of food chemistry. Quality and safety attributes, Chemical and Biological reactions. Pigments digenous to Foods: - a. *Chlorophylls,* b.*Myoglobin* and *Hamnylabin,* c.*Anthocyanins*, d.*Flayoncids*, e.*Proanthocyanidins*, f. *Tannins*, g.*Betalins*, h.*Quinnones* and *Xanthones*. i.*Carotepoids*, J. Miscellaneous Natural Pigments. Colorants added to foods: a. Regulatoryaspects, b. Certified colorants, c. Colorants Exempt from certification. Pigments and other colorants: - Food additives: - Chelating agents: Antimicrobial Antibodies, Non-nutritive and Low-calorie sweeteners: Saccharin. Stabilizers and Thickeners, Firming Texturizers Preservation of food adulteration act: - Undesirable or potentially undesirable constituents of foods. Food safety, plant food stuffs, Animal Foodstuffs, Intentional Food Additives, Produces of Microbial Growth: Mycotoxins, Bacterial Toxins, Chemicals from processing, Accident contaminants. Principles of Preservation: - Principles of food processing, canning and bottling fruits and vegetables, washing balancing, can filling, processing, heat penetration in cans, Effect of Altitude on processing pressure and temperature, Cooling. Discoloration of Fruit Products, Metallic Contamination. Coloring Matter in Fruits and Vegetables, Discoloration in canned food products. Corrosion and perforation of tin plate. Spoilage by Microorganisms. Spoilage by fungi. Storage life of canned products. Hydrogen swells and perforations. Certified Colours. Banned Colours.

Unit– IV: First Aid, civil defense and Disaster management: Objectives: To enable students understand the outline of first aid civil defense and Disaster Management.

First Aid -Definition–Scope and management of Disease, Golden Roles of first aids. Wound and bleeding, Shocks and unconsciousness, Asphyxia, Injuries to bones, muscles joints and dislocation, burns and scalds, poisons, transport of injuries persons structure bearing ,**Basic medicine and treatment, Civil defense** –Principles of first aid in war and warfare problems.

Unit – V: Disaster management: During flood, fire, earth quack, cyclone, tsunami, drought, explosion, train accident, road accident, aircraft and ship accident biological and chemical warfare and Personal hygiene.

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SECOND SEMESTER - PAPER 5

PRACTICAL -ENVIRONMENTAL SANITATION SCIENCE

1. **Water Supply**-Sanitary Well, Shallow Well, Deep well, Horrock's Apparatus, Water Sample Collection For Water Quality Test, Residual Chlorine by using Chloro-scope, To find out the available chlorine in water, Water Quality Test by using Water Test Kit. Study of various types of handpumps. Disinfection and domestic treatment of water supply, Sanitary Survey

2. **Types of latrines and their construction** – Pit Latrine, Lid cover Latrine, Direct pit water seal latrine t, Single offset pit water seal latrine ,double pit water seal latrine, and Ecosan and VIP latrine. Leach Pit and Septic Tank

3. **Solid Waste Management**:Composting methods - Household level Manure pit, Windrow Method, Vermi-compost at community level and Biomedical waste management, sanitary land fill.

4. **Waste Water Disposal**- Leach Pit, Soakage pit, Dispersion Trench, Kitchen garden and drain

5. **Sewage Disposal** – Sewage Treatment Plant, aeration, sedimentation, Oxidation bond, Land Treatment.

SECOND SEMESTER PAPER 6 - PRACTICAL FIELD TRAINING AND INDUSTRIAL VISIT: CONCURRENT FIELD TRAINING AND FIELD OBSERVATION VISITS

1. Collection of general information and introduction on with local leader's
2. Village mapping
3. Household survey
4. Study of vital statistics registration
5. Well survey, water sample collection and chlorination
6. Identification of village leaders

7. Analyzing of data and preparation of presentation
8. Detailed house survey
9. School sanitary survey
10. Inspection of dangerous and offensive trade
11. Hotel-Lodging House-Cinema Theatre-Market-Barber Shop-Bakery-Aerated Water Factory-Rice Mill-Dhobi Khana-Cattle Shed- Collection Food Sampling-Diet Survey Foods With Natural Colour Artificial Colorants
12. Equipment's and their functions
13. Chlorination of water source and testing of the residual chlorine
14. Determination of pH by several methods
15. Air pollution- instrumental techniques for air pollutants
16. Estimation of Chemical Oxygen Demand and Biological Oxygen Demand.
17. Chemical analysis of Water Coliform test
18. Processes in water purification-Disinfection of water
19. Estimation of Fluorine, Removal of Fluorine
20. Estimation of Hardness, Total Dissolved Solids, Turbidity
21. Temperature effect of Microorganisms. Autoclaving use of hot air oven, flaming, boiling. Air velocity, air temperature
22. To study food sampling procedure
23. Auditory Meter for Noise Pollution

OBSERVATION VISITS DURING THE COURSE

1. Meteorological observatory
2. To study the urban Malaria scheme
3. Infectious Disease Hospital
4. Leprosy hospital
5. District Tuberculosis Centre
6. Immunization programme
7. Infiltration gallery
8. Slow sand filtration plantl
9. Rapid sand filtration plant
10. Compost yard
11. Burning & Burial ground
12. Rat proof godown
13. Sewage farm / oxidation pond
14. To study the ventilation system – cotton mill
15. Milk pasteurization plant, Slaughter house
16. To inspect the Industry – Safety measures and canteen
17. Fairs & Festival arrangements
18. Hospital sanitation , Bio Medical Waste Management
19. Primary Health Centre & Health sub Centre, DDHS office
20. Nutrition programme-TINP, ICDS, Noon meal centre
21. Panchayat Raj Institutions Three Tier
22. To study sewerage from (observation visit)
23. Visiting Health Care Products manufacturing small scale and large scale industries

SECOND SEMESTER – PAPER 7

Supervisory Field Training - Project and Viva Voce

Supervisory Field Training(SFT) field placement for two months in Municipal Corporation /Municipality/ Town Panchayats, Primary Health Centre & Health sub Centre, and Government and Private Hospitals Project and viva voce.

Question Paper Pattern for External

(a) For Theory:

Part-A: Answer all 10 questions (objective Type)		10 x 1 = 10 Marks
Part-B: 5 Questions Short Answer either / or pattern		5 x 7 = 35 Marks
Part-C: Any 3 Questions out of Five Descriptive		3 x 10 = 30 Marks
	Total	= 75 Marks

(b) For Practicals:

1. Major Experiments A or B		1 x 15 = 15 Marks
2. Minor Experiments A or B		1 x 10 = 10 Marks
3. Spotters		3 x 5 = 15 Marks
4. Viva-Voce		= 10 Marks
5. Record Note		= 10 Marks
	Total	= 60 Marks

Scheme for Internal Assessment

Tests (Average of Two tests)	= 10 Marks
Assignment	= 5 Marks
Peer Team Teaching	= 5 Marks
Seminar / Group Discussion	= 5 Marks
Total	= 25 Marks

Model Question Paper
PG Diploma in Sanitary Inspector's Course
(Human Anatomy and Physiology)

Time: 3 hours | Marks - 75

Part – A

10 Questions (Two Questions from each unit)

Multiple choice pattern $10 \times 1 = 10$

Part – B

5 Questions Either / Or pattern $5 \times 7 = 35$

Answer Briefly on any 5 questions

1. Classification of Muscle with Example	OR	Functions of cells
2. Explain reflex action	OR	Mechanism of sight
3. Menstrual Cycle	OR	Characteristics of Synovial Joints
4. Mechanism of blood coagulation	OR	Ultra Structure of skeletal muscle
5. Physiology of digestion	OR	Female Reproductive System

Part - C

Answer any 3 questions $3 \times 10 = 30$

1. What is joint? Briefly explain classification of joints with example.

2. Draw diagram of cross section of spinal cord, explain its structure and functions.

3. Write an elaborate account of Physiology of digestion.

4. What are the five types of sensory receptors, explain the physiology of any two receptors.

5. Explain male and female reproductive system of human with neat labelled sketch.

6. Explain the structure and function of heart with labelled sketch.

* * *