FELLOWSHIP IN OCCUPATIONAL HEALTH

CURRICULUM & SYLLABUS:

The curriculum and syllabus for the Course shall be as prescribed by the Standing Academic Board from time to time.

SUBJECTS OF STUDY:
Proposed Curriculum for the Fellowship in Occupational Health, would contain the subjects related to Occupational Health in TWO parts:

- Unit-1 (Occupational Health-I)
- Unit-2 (Occupational Health-II).

UNIT-1 - OCCUPATIONAL HEALTH –I ( 75 Days – 600 Hours)

(Occupational Hygiene-Hazards-Exposure evaluation-Hazards Control-Industrial safety-Labour legislations-Ergonomic at workplaces)

- **Occupational (Industrial ) Hygiene-** Anticipation, Identification, Assessment and Control of all Health Hazards at Workplace; The Walk-Through Survey-Values of MSDS-Evaluation of Health Hazards at Workplaces-

Temperature, WBGT. Atmospheric Pressure Disorders, Barotrauma, Decompression Sickness (Caisson’s Disease), Compression Sickness. Hazards due to Nano-technology—Chemical Hazards, Biological Hazards, Mechanical Hazards at Workplaces, Monitoring techniques, Sampling of contaminants, Direct reading equipment, Portable chromatography, Infra-Red spectro-photometry-Particulate sampling, Filter sampling, Analysis of particulates-Control of Hazards Substitutions, Engineering control, Administrative control, Behaviour control, integrated control, Personal protection- Chemical Hazards(Gases, Liquids, Solids- Irritant gases, toxic gases, asphyxiating gases, Accidents in Confined spaces, Sewages, CETPs. Acids, Alkalies, Solvents, pesticides, Reactive chemical- Chemical Process Safety, Storage, Transport, Handling of chemicals- Heavy metals, Particulate-Silica, Asbestos - Biological hazards-Bacterial, Viral, Fungi, Moulds- Exposure evaluation, Sampling techniques, Personal monitoring, Biological monitoring, Threshold Limit Values (TLV), STEL. Biological hazards (Bacterial, Viral, Fungi, Moulds), Hospital Waste management.

- **Hazards Exposure evaluation:** Sampling techniques, Personal monitoring, Biological monitoring; Threshold Limit Values (TLV), STEL; List of Industries involving Hazardous process Occupational Hazards under the First Schedule of the Factories Act,1948; Permissible Limits of certain Chemical substances in work environment under the Second Schedule of the Factories Act,1948;

- **Hazards Control :** Elimination, Control, Substitution, Isolation, Personal Protective Equipment(PPE).

- **Industrial Safety-** Causes of Accident, Accident statistics, Accident Reporting system, Safety Audit, Accident prevention, Disaster Planning, Safety Committee, MAHC, Case studies on Bhopal, Chernobyl and similar disasters.

• **Ergonomics at workplaces:** Ergonomics- Human Factors in Engineering, Approach to Job Design, Use of Anthropometric data, Improvement of Work, Workplace design( Design control, Displays-Control relationship-, Avoidance of Static positions at work, Illumination at Workstations, Proper Design of Seating arrangements-Chairs, Setting up of Computer Work stations, ( monitor positions, Screen control, In-put devices, Key Board ), Task variations, Exercise while at work, Controlling Risk factors to reduce body injuries, Repetitive Strain Injuries, Musculo-skeletal injuries, Effects of vibration hand tools, Principles of lifting weights, Push-Pull, Estimating Work capacity.

• **Occupational Health organizations:** Understanding National and International organizations involved in Occupational Health: DGFASLI, DGMS under the Ministry of Lablour & Employment , NIOH, AIHHPH under the Ministry of Health & Family Welfare, NIOSH,ACGIH,OSHA,ILNO,WHO,WTO etc.

**UNIT-2 OCCUPATIONAL HEALTH-II ( 75 Days = 600 Hours)**

(Community Medicine-Occupational Physiology - Occupational Work) Psychology-Occupational Medicine-Occupational Diseases- First-aid in industry- Occupational Health Services-OHS)

**Community Medicine:** Concepts of health and disease, Principles of epidemiology and epidemiologic methods, Screening for diseases, Communicable ( special emphasis on TB,HIV) / Non-communicable ( special emphasis on DM,HT,CVDs, Stroke etc)., Disease surveillance systems, Epidemiology & Biostatistics , Demography and family planning, Preventive medicine in Obstetrics, Geriatrics, Nutrition and health, Mental health, Health information , Health education and communication, Occupational Health related International programme under WHO-ILO etc.

**Occupational Physiology:** Estimation of Work Capacity, Endurance Test, Treadmill Tests, Pre-Placement Tests, Vision tests, Pulmonary Function Test; Physical fitness Certification ( through initial and periodic medical examinations), Fatigue, Vision standards, Pulmonary Function Test, Hearing Assessment ( Audiology), Fatigue and Rest Periods; Use of Anthropometric data, Improvement of Work, Workplace design, Approach to Job Design, Avoidance of Static...


**Occupational Medicine:** History in Occupational Health; the role of the primary care physician in occupational medicine; principles of occupational epidemiology; general principles of toxicology, metal toxicology, clinical immunology; occupational infections; occupational haematology; occupational dermatitis; occupational lung diseases; Pneumoconiosis, cardiovascular toxicology; gastrointestinal tract and liver toxicology; renal toxicology; neuro toxicology; reproductive toxicology; occupational cancer; Occupational ophthalmology; health protection and promotion and counselling; Emergency Medicine, trauma and emergencies in the workplace, Triage, Ambulance, transportation, BCLS, ACLS.
**Occupational Diseases:** Detailed study of all the Occupational Disease, especially those under the List of Notifiable Diseases of The Factories Act1948 (Schedule-III-29 Diseases), The ESI Act, 1948 Schedule-II (Part-A,5- diseases, Part-B,24-Diseases,Part-C,5-Diseases), and their causes, early detection, investigations, differential diagnosis, treatment and control. Ref-Annex- III


**Occupational Health Services** : Standards, principles, practice; Health Information System (Medical Records), quality and occupational health audit, Organization, function, management, staffing, infrastructure building, occupational health services- standards, principles, practice; record systems, quality and occupational health audit. Hearing Conservation /Vision Conservation Programme, Occupational Health Surveillance, Health screening; Early detection of occupational diseases-its prevention, treatment and control; etc

**INDUSTRY BASED TRAINING( 40 Days = 320 Hours)**

Industrial exposure would help the trainees (doctors) to get to know the hazardous process in the industry, understand the disease causative agents , which could be controlled, and eventually appreciate the Cause and Effect cycle of the industrial hazards and work-related health disorders in order to manage in prevention of industrial hazards, promotion of health among the industrial workforce, protection of the worker from any hazards that may be encountered at the work site and placement of worker suiting to his physical, mental, social abilities.
INSTITUTION-CLINICAL BASED TRAINING (40 Days = 320 Hours)

Clinical exposure in medical colleges, corporate hospitals, ESIC health centers, factory medical units etc would help in gaining the knowledge and skills in work-related disorders /diseases and prepare primarily to prevent these illness ; secondly the medical team to advise the industries to improve the technology so as to eliminate / control the health hazards at work-places; third to plan for early intervention to diagnose and treat the occupational diseases; fifth to scientifically rehabilitate the disabled employees in an occupation suiting to their capabilities.

Visits to Healthcare institutions, Hospitals, Occupational Health enters to under go training in clinical, investigative, diagnostic, treatment, rehabilitation etc.

DISSERTATION WORK (40 Days = 320 Hours)

The Dissertation work allows candidates to demonstrate their competence in a practical setting. Training courses should provide instruction for this element of the Diploma in the Practical Module . An important part of the practice of occupational health is good, clear and authoritative written communication with employers and medical colleagues and the work provides a good opportunity to demonstrate these skills. It will be well structured and professionally presented. Preparation of the Project may commence at any time although it may only be submitted a month before well in advance of the examination. The work would comprise of understanding Workplace hazards and its effect the health of the workforce by applying other allied areas viz. safety engineering, applied chemistry, health physics, ergonomics, toxicology, epidemiology, bio-statistics, environmental health, industrial relations, public policy, sociology, labour legislations and occupational health physiology and psychology.

The candidates shall comply with completing Internal Examination in Theory papers, Project work, Log Book, which carry 50 marks, prior to the University examination. Completion of this formalities is prerequisite for taking up final University Examination.
## Scheme of Examinations

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## Annexure - I

(Under the Tamil Nadu Factories Act 1950, the following are the Hazardous Industries, where the posting of Medical doctors qualified in Occupational health is mandatory. Affiliated Industries / Institutions offering the Fellowship programme should make arrangements with a cross section of these industries to train the candidates at the workplace sites)

List of Industries to be visited during the training period: There are 29 types of Hazardous Industries enlisted under the Factories Act, 1948, the First Schedule (Sec. 2(cb). At least 10 of them shall be covered paying visit, field study, maintain Log Book, listen to lectures at the shop floor, discuss in group.

1. Ferrous Metallurgical Industries:
   - Integrated Iron and Steel
   - Ferrous –alloys
   - Special Steels

2. Non-ferrous Metallurgical Industries
   - Primary, Metallurgical Industries, namely zinc, lead, copper, manganese and aluminium
3. Foundries (Ferrous and non-ferrous)
   • Castings and forging including cleaning or smoothing / roughening by sand and shot blasting.

4. Coal (including coke) industries
   • Coal, Lignite, Coke etc
   • Fuel Gases (including Coal gas, Producer Gas, Water gas)

5. Power Generation Industries

6. Paper and Pulp (including paper products) industries

7. Fertilizer Industries
   • Nitrogenous
   • Phosphatic
   • Mixed

8. Cement Industries
   • Portland Cement (including slag cement, Puzzolona cement and their products)

9. Petroleum Industries
   • Oil Refining
   • Lubricating Oils and gas

10. Petro-chemical industries

11. Drug and Pharmaceutical Industries
   • Narcotics, Drug and Pharmaceuticals

12. Fermentation Industries (Distilleries and Breweries)

13. Rubber and (Synthetic) Industries

14. Paint and Pigment industries

15. Leather tanning Industries

16. Electroplating Industries
17. Chemical Industries

- Coke Oven, By-products and Coal-tar distillation products
- Industrial Gases, (nitrogen, oxygen, acetylene, argon, carbon-dioxide, hydrogen, sulphur-dioxide, nitrous oxide, halogenated hydrocarbon, etc)
- Industrial Carbon
- Chromates and dichromates
- Lead and its compounds
- Electrochemicals (metallic sodium, potassium and magnesium, chlorates, perchlorates and peroxide)
- Electrothermal products (artificial abrasive, calcium oxides)
- Nitrogenous compounds (cyanides, cyanamides and other nitrogenous compounds
- Phosphorus and its compounds
- Halogens and Halogenated Compounds (Chlorine, Bromine, Iodine, Flourine)
- Explosives (including industrial explosives, detonators and fuses)

18. Insecticides, Fungicides, Herbicides and other Pesticides Industries

19. Synthetic Resin and Plastics

20. Man-made Fibre (Cellulosic, non-cellulosic)

21. Manufacture and repairs of electrical accumulators

22. Glass and Ceramics

23. Grinding and Glazing of metals

24. Manufacturing handling and processing of asbestos and its products

25. Manufacture, handling and use of benzene and substances containing benzene

26. Manufacture of oils and fats from vegetable and animal sources

27. Manufacturing processes and operation involving carbon-disulphide

28. Dyes and dyestuffs including their intermediates

29. Highly inflammable liquids and gases
Annexure-II

Visits to Healthcare, Medical, Welfare related Institutions as a part of Training:

The training of Doctors in Occupational Health also involves exposure in wider areas of community related healthcare issues and study the same in relation to the Course completion. Minimum of TEN institutions be visited as field study.

Community Health: Epidemiology-Bio-statistics teaching centers, communicable/non-communicable diseases centers, Veterinary health centers to study zoonosis, Public Health department (Taluk and District level), Social science departments, Environment Health departments, Genetic health centers, Mental health centers, NGOs healthcare, Water supply & Drainage, Air and Soil pollution related to industrial activities, Population profile, Vital statistics, District/Sate level healthcare Model Industrial Township to study the Health, Safety, Welfare, Environment programmes, CSR (Corporate Social Responsibility) implementation by the industries for the benefit of the neighbourhood community, Unorganised sectors viz. textile, dyeing, fireworks, dyeing, stone quarry, flour mills, laundry, hotels, small vendors, sewage cleaners, etc., Institutions care for Child Labour Welfare, SHG (Self-Help Group) units, National Rural Govt. Employment Scheme Administrative centers,


ANNEXURE-III

The Candidates undergoing training should have thorough knowledge of the Occupational Diseases in general and specifically the 29 Notifiable Diseases under the Factories Act,1948 ,The Third Schedule (Sec.89 and 90). The list of Diseases is more or less the same in the ESI Act,1948, Schedule-II (Part-A,5- diseases, Part-B,24-Diseases,Part-C,5-Diseases).
While these diseases carry symptoms similar to the illness arising out of general causes, they may be differentiated with Medical History taken from the job inventory the workers are exposed to. Generally it is very rare to find such diseases diagnosed in conventional medical practice as the occupational backgrounds are not routinely probed. Hence the candidates shall have thorough knowledge in the Workplace hazards to relate them to the diseases /disorders. Such training is routinely done in any hospitals. The candidates undergoing training would develop such skill by examining cases as mentions in the list and come to a diagnosis of work relation.

The postings in hospitals may not be helpful to get case specifically of occupational origin. However the cases of above nature may be examined with the background of Occupational History.

**LIST OF NOTIFIABLE DISEASES:**

1. Lead poisoning, including poisoning by any preparation or compound of lead or their sequelae
2. Lead tetra-ethyl poisoning
3. Phosphorus poisoning or its sequelae
4. Mercury poisoning or its sequelae
5. Manganese poisoning or its sequelae
6. Arsenic poisoning or its sequelae
7. Poisoning by nitrous fumes
8. Carbon bisulphide poisoning
9. Benzene poisoning, including poisoning by any of is homologous, their nitro or amino derivatives or its sequelae
10. Chrome ulceration or its sequelae
11. Anthrax
12. Silicosis
13. Poisoning by halogens or halogens derivatives of hydro carbon of aliphatic derivatives
14. Pathological manifestation due to-

   (a) Radium or other radioactive substances

   (b) X-rays

15. Primary Epitheliomatous Cancer of the skin

16. Toxic anemia

17. Toxic Jaundice due to poisonous substances

18. Oil Acne or dermatitis due to mineral oils and compound containing mineral oil:

19. Byssinosis

20. Asbestosis

21. Occupational contact dermatitis caused by direct contact with chemicals and paints

22. Noise Induced Hearing Loss (NIHL)

23. Beriillium poisoning

24. Carbon-monoxide poisoning

25. Coal Miners’ (Workers’) Pneumoconiosis

26. Phosgen poisoning

27. Occupational Cancer

28. Iso-cyanate Poisoning

29. Toxic Nephritis

A *notifiable disease* is any disease that is required by law to be reported to government authorities. The collation of information allows the authorities to monitor the disease, and provides early warning of possible outbreaks. Many governments have enacted regulations for reporting of diseases. The Factories Act 1948 have list of occupational diseases enlisted in the Schedule III for the purpose of hazards monitoring, treatment/control/ elimination by the employers and information to the statutory authorities.
There are 29 occupational diseases which are required to be notified under the Factories Act, 1948. The reasons for a very small number of notification is that many cases which do occur are unrecognized. Most of the occupational disease have long latent period and often considered as way of life. People still believe that the disorders or disease arising out of occupation are routine and nothing abnormal and one has to live with it. Cases which occur will tend to do so in poorly controlled factories where there is unlikely to be any qualified medical or nursing supervision and the onus will thus be on the general practitioner to make the diagnosis. Most the occupational diseases do not have much specifically from normal occurring symptoms, unless or other wise one is very keen and observant to focus on this issue. Those concerned in the diagnosis are general practitioners or specialists in hospital and mostly unaware of the working conditions or the disease must be notified. The employers have a very powerful lobby to under play the occupationally related illness if diagnosed. Having the fear of facing liability to pay compensation if cornered, they go all out to suppress the information or use influence to fight against if such decisions are made. The occupational health physician who is mostly the paid employee of the industry also fall into this chain of ignoring the work relation to any condition arising out of the hazards at workplaces. Hence the probability of under reporting is generally very high.

The occupational diseases to be of notifiable nature are considerably few in numbers restricted to small groups. There are usually extreme stringent conditions which must have been met by the individual in terms of severity and length of exposure. The disability are usually be great before attracting compensation. Such incidents are very rare and limited and the amount of compensation is very small.

Annexure - IV

FELLOWSHIP IN OCCUPATIONAL HEALTH IS BASICALLY A COURSE TO TRAIN DOCTORS IN THE FOLLOWING AREAS OF INDUSTRIAL HEALTH CARE PLAN

- Prevent, eliminate, control and treat the diseases/disorders arising out of occupation;
- Participate in the Prevention of the Physical, Chemical, Biological, Mechanical, Psychological Hazards at Workplaces, closely working with the industry’s team;
- Plan with evidence based data to place the works on safe jobs, so as to make the benefits reach mutually both to the workforce and the industry;
- Promote positive health among workforce through continuing health education;
- Conceptually when the healthy workers are placed on the health jobs produce much better than an unhealthy worker (who are bound to be a liability to the industry). Larger the number of Unhealthy workers, the greater would be the loss to the industry in terms of increasing healthcare cost, sickness absenteeism and loss of production.
The qualified doctor with Fellowship in Occupational Health is named differently in industries by

- **Occupational Health Physician (OHP)**
- **Industrial Medical Officer (IMO)**
- **Factory Medical Officer (FMO)**
- **Specialist Occupational Health**
- **Consultant Occupational Health.**

The Industry should make all efforts to position a qualified doctor in Occupational Health, who would primarily help industry in Disease/Disorder prevention procedures closely working with industrial departments, Process managers, Production managers, Environment managers, HR managers, Safety managers etc., to get integrated with them as a team; Promote health workforce through counselling sessions, training programmes, designing ergonomic programmes to make the work less fatigue; In case of certain eventualities like accidents, diseases etc., the workers are to be medically taken care by the Doctor through advocating First-aid at shop-floor level, transportation to the medical centers, consulting medical specialist in the respective discipline.; Eventually to help the worker return to the job early and maintain disorder free status.

It is a known fact that these disorders/diseases arising out of occupation, namely Occupational Diseases or Notifiable Diseases are not generally curable but controllable. Hence preventive measures are given prime importance in training the doctors. Hence they are to be oriented towards studying the health hazards in industries, assess the hazards through industrial hygiene study, relate these data with the health of the workers who are exposed to such hazards, conduct medical screening periodically (Periodic Medical Examination) for early diagnosis, and keep the industry informed and updated on the health status of employees so as to control the hazards at industry level and equally place the workers in a hazard free environment; if the disability has already exist, to plan for limiting such disabilities so that, the disorder will not progress; and if already disabled, the doctor would plan to rehabilitate the worker and recommend alternate type of work in the industry which would suit the worker’s disability.

The Doctor qualified in Occupational Health is primarily a Manager in Industry to command in all respect, benefits, position elevation etc., in the industry where he/she is employed. They also maintain status to interact directly to the Chief-Executives of the Industry, as the health being a very sensitive issue and seek support to build the Occupational Health Center which forms the best image of the company. He would be an important part of the Management team in all policy making which related to healthcare both in industry and in dependent community.
He also maintains liaison with key department heads in the industry, community representatives, district/state level contact with enforcing agencies viz. the Collectorate, Inspectorate of Factories, Pollution Control Boards, Panchayat bodies etc, which play a vital role in case of any serious emergencies like disaster, accidents etc. from industry which may have impact on the neighbourhood community like the Bhopal Disaster and similar major or minor incidents which, alls under the Govt. Off-Site Emergency Management.

**CORE COMPETENCIES FOR SPECIALIST - OCCUPATIONAL HEALTH TO PRACTICE THE DISCIPLINE ON OBTAINING FELLOWSHIP CERTIFICATE:**

- The specialized Occupational Health Physician is competent to carry out the following functions.

  **Identification and assessment of the risks from health hazards in the workplace:**
  a) undertaking workplace assessments and advising on control methods;
  b) diagnosing work-related ill health;
  c) organizing appropriate investigations for diagnosis of occupational disease;
  d) recognizing the need for specialist assessment of the working environment through use of other multidisciplinary team members (toxicologists, hygienists, ergonomic specialist, psychologists, etc.) and organizing the team;

- **Surveillance of workers’ health based on legal requirements,**
  a) pre-placement health screening and medical examinations;
  b) periodic examinations;
  c) exit examinations on leaving the enterprise;
  d) other medical examinations;
  e) biological exposure monitoring and biological effect monitoring;

- **Surveillance of the factors in the working environment and working practices which may affect workers’ health:**
  a) monitoring of workplace hazards including physical, chemical, biological, ergonomic, psychosocial and other hazards;
  b) organizing and undertaking workplace inspections;
  c) organizing health surveillance for workers exposed to occupational hazards;
  d) selecting biological monitoring on the basis of criteria of validity for the protection of the health of the worker concerned, with due regard for the sensitivity, specificity and predictive value of the tests concerned;

- **Advising on occupational health, safety and hygiene, ergonomics and on individual and collective protective equipment:**
  a) assessing control systems designed to eliminate or reduce exposure;
  b) selecting appropriate personal protective equipment with the assistance of other experts as required;
  c) advise on the ergonomic design of the workplace and working tools;
• Organizing first aid and emergency treatment:
  a) advising on the provision of first aid facilities and emergency procedures;

• Advising on the planning and organization of work including the design of workplaces, the choice, maintenance and condition of machinery and other equipment, and on substances used in work:
  a) advising on the introduction of new working systems and techniques;
  b) including the human factor in the process design of the enterprise, workplace and working tools;

• Promoting the adaptation of work to the worker; assessing disability and fitness for work, promoting work ability:
  a) Risk assessment of workplace hazards (as above) with advice on prevention of harm;
  b) Assessment of disability and fitness for work, pre placement and following work-related illness/ injury;
  c) Assessment of impairment, disability and handicap in relation to work;
  d) Clinical management in rehabilitation of disabled workers;
  e) Application of ergonomics to rehabilitation;
  f) Application of organizational psychology to rehabilitation in situations of work-related mental ill health;
  g) Counselling employees regarding sickness absence;
  h) Management of workers with drug or alcohol problems;
  i) Advising on rehabilitation and redeployment;
  j) Advising on maintaining aging and disabled workers in work;
  k) Promoting work ability: health, skills and training in relation to the demands of work;

• Advising on fitness for work and adaptation of work to the worker in the special circumstances of vulnerable groups and specific legislation.

• Collaborating in providing information, training and education in the field of occupational health, safety and ergonomics to management and the workforce:
  a) Communicating with people from various backgrounds and with different levels of technical understanding;
  b) Organizing and writing reports as precisely and quantitatively as possible;
  c) Making clear oral presentations;
  d) Counselling;
  e) Participating in committees, in particular the health and safety committee;
  f) Participating in analysis of occupational accidents and diseases;

• Advising on, supporting and monitoring the implementation of occupational health and safety legislation:
  a) Application of occupational health law and ethics to individual cases;
  b) Advising managers on the implementation of health and safety law;
  c) Advising on health and safety policy;
  d) Advising workers and workers’ representatives of their legal obligations;
  e) Evaluation of compliance with legislation.
• Contributing to scientific knowledge regarding hazards to health and safety at work, by research and investigation into health and work ability problems at work, following the ethical principles attached to research work and to medical research and including an evaluation by an independent committee on ethics, as appropriate:
  a) Conducting a formal scientific investigation;
  b) Carrying out a literature search and preparing a report;
  c) Interpreting scientific data in journals and from own research;
  d) Planning simple surveys;
  e) Recognizing and initiating the investigation of work ability, health determinants and disease in the workforce;
  f) Analyzing routinely collected data, including sickness absence and accident data;
  g) Developing Reporting system to the management and the workforce.