Quality Assurance Unit

Tanta University

Faculty of Medicine

Department of Chest

Course Specifications

Master Degree of Chest

3rd semester

2021-2022

Master Degree of Chest Course Specifications

University: Tanta **Faculty: Medicine** **Department: Chest**

A- Administrative Information

1. **Course title: M Sc. Chest Diseases 3rd semester**
2. **Department offering the program: Chest Department**
3. **Department responsible for the course: Chest Department**
4. **Course code: CHEST 8006**
5. **Level: Second Part: 9 credit-hours. (15 weeks)**
6. **No. of Credit / taught hours:**

The course	Obligatory hours	Practical hours	Scientific activity	Elective hours
Credit hours	4 hours	3 hours	1 hour	1 hours
Taught hours	60 hours	90 hours	60 hours	15 hours

7. **Authorization date of course specification:21-8-2019**

B- Professional Information

1 – Overall Course aims

Purpose of the curriculum:

The purpose of this curriculum is to provide the basis for training in the specialty of Chest Diseases to the level of award of a Certificate of Completion of Training. At this level, the doctor should have the knowledge, skills, attitudes and competencies to practice as an independent specialist practitioner, at Consultant level.

Professionalism is a difficult quality to define. One definition proposed by the Royal College of Physicians is "a set of values, behaviors' and relationships that underpin the trust that the public has in the profession." Professionalism includes the ability to deal with diagnostic and therapeutic uncertainty. Whilst this curriculum attempts to spell out the knowledge, skills attitudes and behaviors' that underpin training in Chest Diseases, the attributes which make up the "professional" specialist are much more than the simple sum of all these added together. The progression from candidate to professional requires, in addition to the simple acquisition of the building blocks

described in this curriculum, the development of a high degree of personal and professional maturity and this requires time, experience and the internalization by the candidate of a whole variety of attributes that he/she is exposed to in the work place. In part, this also involves learning by example, such that it is incumbent on all trainers to ensure that their candidates are exposed to appropriate work place and learning environments.

OBJECTIVES OF CHEST DISEASES SPECIALTY CURRICULUM:

The candidate will be given the opportunity to become competent in:

1. Establishing a differential diagnosis for patients presenting with clinical features of respiratory disease by appropriate use of history, clinical examination and appropriate investigations.

2. Applying knowledge derived from the appropriate basic sciences which are relevant to Chest Diseases.

3. Applying appropriate and sufficient knowledge and skills in the diagnosis and management of patients with respiratory disease to ensure safe independent practice at NHS independent Consultant Specialist level.

4. Developing a management plan for the "whole patient." This should include not only the appropriate treatment but also take into account health promotion, disease prevention, long-term management plans and palliative care medicine where appropriate.

2 – Intended learning outcomes (ILOs):

a. knowledge and understanding:

By the, end of the 3rd semester the candidate will have gained knowledge and systematic understanding of:

a.1. Discuss the various causes and pathogenesis of diseases in respiratory medicine.

a.2. Express the clinical manifestations and differential diagnosis of respiratory diseases with an emphasis on the incidence of the different manifestations and their relative importance in establishing the diagnosis, and the early manifestations of serious diseases .

a.3. Explain the scientific basis and interpretation of diagnostic studies with knowledge of the study / studies of choice in any specific situation and of the accuracy of the study in establishing diagnosis.

a.4. Express the principles, the indications, the relative advantages and disadvantages of various therapeutic modalities including mental health care and behavioral modification, nutritional therapy, pharmacotherapy, surgery, radiotherapy, immunotherapy and physical rehabilitation as applied to common clinical situations in respiratory medicine.

a.5. Summarize the theories and principles that govern ethical decision making in clinical practice and the major ethical dilemmas in respiratory medicine, particularly those that arise at the beginning and the end of life and from the rapid expansion of medical knowledge and technology.

a.6. Identify the relevant airways and pulmonary vascular structures and their relation to each other in order to help the candidate while performing invasive bronchoscopy or non invasive imaging by all imaging techniques (e.g. CT, MSCT pulmonary angiography and MRI

a.7. Specify information from different types of sample from the lung, view of the pathologist.

a.8. Summarize the classification, mode of action, indications, contraindications, interactions and adverse effects of drugs used in the field of pulmonary medicine especially asthma and COPD.

a.9. Outline the WHO International Health Regulations (2005)

a.10. Outline WHO Epidemic and Pandemic Alert and Responses (EPR)

b. Intellectual skills:

By the end of 3rd semester the trainee will be able to:

(b.1.) Data acquisition:

b.1.1. Obtain and document a complete and a focused medical history for a patient with respiratory disease.

b.1.2. Perform and document a complete and a focused physical and mental status examination for a patient.

b.1.3. Perform an emergency - directed examination for patients with common respiratory emergencies.

b.1.4. Utilize sources of information in addition to the patient interview to augment the medical history. Such sources include family or friends, medical records and other health care professionals.

b.1.5. Identify anatomic landmarks on postmortem specimens

b.1.6. Take a relevant history of a patient's medication regimen

(b.2.) Data analysis and problem solving:

b.2.1. Interpret patient symptoms and physical findings in terms of their anatomic, pathologic and functional diagnostic significances.

b.2.2. Identify problems, prioritize them, and generate a list of initial diagnostic hypotheses (differential diagnosis) for each problem.

b.2.3. Select the most appropriate and cost effective diagnostic and therapeutic producers for each problem.

b.2.4. Interpret the results of diagnostic procedures.

b.2.5. Use the results of all tests ordered to modify the problem list and the differential diagnosis accordingly.

b.2.6. Combine the clinical and investigational database, with the evidence based knowledge in clinical problem solving.

b.2.7. Clinical assessment of different cardiac, renal and hepatic diseases and their impact on the chest.

(b.3.) Skills related to treatment strategies:

b.3.1. Recognize patients with immediately life-threatening conditions and institute appropriate initial therapy.

b.3.2. Recognize patients with serious conditions requiring critical care and institute course of management according guide lines available.

b.3.3. Design and apply rational therapeutic strategies for both acute and chronic conditions that take into account the various variables that influence these strategies.

b.3.4. Deal with complications of respiratory diseases.

b.3.5. Achieve consensus with the patient or the patient's relatives on the treatment plan selected.

b.3.6. Monitor the effectiveness of therapy by identifying clinical and investigative parameters to be used in assessing the patient's response to treatment and re-evaluate management plan accordingly.

c. Professional and practical skills :

By the end of the 3rd semester the trainee will be able to:

(c.1.) Communication skills:

(c.1.1.) Patient- doctor relationship

c.1.1.1. Apply respect to all patients irrespective of their socioeconomic levels, culture or religious beliefs and use language appropriate to the patient's culture.

c.1.1.2. Conduct patient interviews that are characterized by patience and attentive listening.

c.1.1.3. Explain to the patient or the patient's relatives the nature of illness, the diagnostic plan, the treatment options and the possible complications in such a way that is easily understood, answers patient's questions, encourages discussion and promotes the patient's participation in decision making.

c.1.1.4. Write clear concise patient records: admission sheet, progress notes, physician orders, and referrals for consultation, discharge summary and follow-up notes.

c.1.1.5. Use appropriate skills and strategies of communication during difficult situations such as giving bad news and dealing with angry patients.

c.1.1.6. Discuss medical errors or professional mistakes honestly and openly in a way that promotes patient trust and self-learning.

(c.1.2.) Relation to collaboration with healthcare professionals:

c.1.2.1. Communicate effectively with other health care professionals to maximize patient benefits and minimize the risk of errors.

c.1.2.2. Respect the role and contributions of other health care professionals regardless of degree or occupation.

c.1.2.3. Undertake appropriate formal and informal consultations with colleagues and perform appropriate referrals to other health care professionals.

c.1.2.4. Write a concise and informative report on patient(s) conditions.

c.1.2.5.Work effectively as a member or a leader of an interdisciplinary team, and acquire the ability to develop and apply management plans for patients in collaboration with the members of the team.

c.1.2.6. General measures to reduce spread of infection in hospital wards

d. General and transferable skills:

by the end of the 3rd semester the trainee will be able to

(d.1.) Life-long learning:

d.1.1. Show commitment to life-long self-learning.

d.1.2. Use the sources of biomedical information to remain current with advances in knowledge and practice.

d.1.3. Frame a question, search the literature and utilize the obtained information to solve a particular clinical problem or plan management of an individual patient according to the principles of Evidence-Based Medicine.

d.1.4. Know the principles of critical Appraisal of scientific research.

(d.2.) Ethical behavior:

d.2.1. Identify alternatives in difficult ethical choices, analyze considerations supporting different alternatives and formulate course of action that takes account of this ethical complexity.

d.2.2. Behave towards patients in a manner consistent with the ideals of profession by consistently doing the following:

d.2.3. Treat the patient as a person, not a disease, and understand that the patient is a person with beliefs, values, goals and concerns which must be respected.

d.2.4. Respect the patient's dignity, privacy, information confidentiality and autonomy.

d.2.5.Deliver care in a way that will allow the patient to feel he / she has received medical care in a caring, compassionate and human manner.

d.2.6. Maintain honesty and integrity in all interactions with patients, patient's families, colleagues and others with whom physicians must interact in their professional lives.

d.2.7. Maintain a professional image in manner, dress, speech and interpersonal relationships that is consistent with the medical profession's accepted contemporary standards in the community.

d.2.8. Be responsible towards work and in emergency situations.

d.2.9. Advocate the patient's interests over ones' own interests.

d.2.10. Provide care to patients who are unable to pay.

d.2.11. Recognize and effectively deal with unethical behavior of other members of the healthcare team.

d.2.12. The trainee should consider the cost implications of cost benefit of various treatment modalities.

(d.3.) skills related to social and community context of healthcare:

d.3.1. Define the Egyptian healthcare system and the community based resources and services and properly-utilize them to provide high quality and cost-effective patient and community care.

d.3.2. Participate actively in health promotion, disease prevention.

d.3.3. Deal appropriately with a specific community health problem

3-Course contents

1. Obligatory hours

4 credit hours = 60 taught hours distributed as follows:

1 Asthma	**10 hours**
2 COPD	**10 hours**
3 Broncіectasis and other airway diseases	**8 hours**
4 Cystic fibrosis	**6 hours**
5 Smoking cessation /respiratory disease prevention	**6 hours**
6 Imagining techniques	**8 hours**
7 Broncoscopy	**7 hours**
8 Skin testing (tuberculin and allergy tests)	**5 hours**

2. Practical training:

3credit hours =Total 90 hours .

Clinical problems that must be observed, managed under supervision & managed independently by Pulmonary Medicine candidate

Acute and chronic dyspnea
Undifferentiated chest pain
Cough and expectoration
Hemoptysis
Bronchial asthma
COPD

Bronchiectasis and suppurative lung diseases

3. Scientific activity

1credit hour =Total 60 hours.

a- Seminars and bedside teaching:

1 taught hour /week

b- Workshops, Congresses, Thesis discussion and Chest conferences (Those which have credit hours will be accepted as it is)

c- Practical procedures:

Each procedure has 1 scientific hour.

The candidate should fulfill at least 10 different procedures.

Procedure/ Investigation	Level of participation	Level of Competence
Spirometry	Interpret & report	III
ABG	Attend &Interpret Perform	III
Thoracocentesis	Attend Perform	III
FOB: BAL	Attend Assist Perform	III
FOB: NB	Attend Assist Perform	II
Non invasive ventilation	Attend Assist	III

Procedure/ Investigation	Level of participation	Level of Competence
	Perform	
Invasive ventilation	Attend Assist	II
Endotracheal intubation	Attend & assist Perform	II
Polysomnography& Sleep studies	Attend Perform	II
Pulmonary rehabilitation & physiotherapy	Attend & assist Perform	III
Nutritional support in ICU	Attend & assist Perform	III
CXR & CT	Interpret & report	III
Thoracoscopy	Attend & observe	II
Intercostal intubation & pleural biopsy	Attend & observe	II
ECG & Echocardiography	Perform & interpret Attend & interpret	III II
Rigid bronchoscopy	Attend & observe	II
Cardio-pulmonary resuscitation	Attend & assist Perform	III
Advanced pulmonary functions	Attend & observe Interpret	II

Definition of the levels of competence

Level I: Experience of selecting the appropriate diagnosis modality & interpreting the results or choosing an appropriate treatment for which the patient should be referred. This level of competence does not include performing a technique.

Level II: Practical experience, but not as an independent operator (has assisted in or performed a particular technique under the guidance of a superior staff).

Level III: Is able to independently perform the technique or procedure unaided.

4-Teaching and learning methods:hybride

The following methods of teaching and learning will be used in fellowship of Pulmonary Medicine training program

1) Apprenticeship learning (experiential learning):

- **Observation b-1,b-2,b-3**
- **Assisting b-2, b-3, d-3**
- **Participation c-1, d-3**
- **Supervised Performance d-1,d-2, d-3**
- **Independent Performance b-1,b-2,b-3 ,c-1,d-1,d-2,d-3.**

2) Formal Teaching: online lecturer Practical:attendance

- **Lectures a-1, a-2,a-3.**
- **Seminars a-4, a-5, a-6, a-7.**
- **Clinical ward rounds b-1,b-2,b-3 ,c-1,d-1,d-2,d-3**
- **Crash courses**
- **Workshops. d-1, d-2, d-3.**

3) Self study

- **Library a 1- 10**
- **Textbook a 1- 10**
- **Journals d-1, d-2, d-3.**
- **Internet b-1,b-2,b-3,d-1,d-2,d-3**

4) Meetings and Conferences c-2, d-1,d-2,d-3

5) Supervised Research b-1,b-2, c-2, d-1

5-Student Assessment: may be electronic but inside the faculity(face to face)

The general rules and regulations of assessment approved by Tanta University.

<u>The end semester exam:</u>

In addition to the successful completion of the training program, all candidates must successfully pass the end semester exam in the form of …….

6-List of references

6.1 Course notes

6.2 Text book

Fishmann's Chest Diseases

Murray Pulmonary Medicine

Crofton and Douglas Pulmonary Medicine

6.3 Recommended books

6.4 Periodicals and web site

American Review Respiratory and Intensive Care Medicine

European Respiratory Journal

Chest

Thorax

7-Other resources/ facilities required for teaching and learning to achieve the above ILOs

None

8-we certify that all of the information required to deliver this course is contained in the above specifications and will be implemented

We verify that the above Course and the analysis of students and external evaluator opinions are accurate.

Course coordinator and head of department
name……..signature…….Date…….

Head of quality assurance unit:
name……..signature…….Date…….

The ILOs of the 3rd semester course specifications included in the appendix are integral part of this course program.

Appendix

A. Clinical ILOs

1 Breathlessness

Objective

Be competent to carry out specialist assessment of severity and form a structured differential diagnosis leading to appropriate further investigation and management

Candidate must have experience (minimum of 2 years) in dealing with patients presenting with

ochronic symptoms in outpatient department

oacute symptoms in acute/emergency admissions unit

Be able to manage the breathless patient effectively

Knowledge

Causes of breathlessness

Differentiate cardiac, respiratory, neuromuscular and metabolic causes

Know and understand pathogenesis of causes

Know and understand management/treatment

Pharmacology of drugs used

Relevant guidelines

Skills:

Performance and interpretation of spirometry (competence)

Interpretation of other appropriate Lung Function Tests (competence)

Interpretation of Chest Radiology:

- Chest X-Ray

- V/Q scans

- Chest CT scans (competence))

Performance and interpretation of arterial blood gases (competence)

Use of inhaled and nebulised drug therapy (competence

2 Cough

Objective

Be competent to carry out specialist assessment and form a structured differential diagnosis of causes leading to appropriate further investigation and management

Candidate must have experience in assessing patients referred to the outpatient department with cough (minimum of 2 years)

Be able to manage the patient with cough effectively

Knowledge

Causes of cough with:

oNormal CXR

oAbnormal CXR

How to formulate an appropriate differential diagnosis

Appropriate investigation of cough, including specialist studies

ENT causes

Management/treatment of cough linked to underlying diagnosis

Pharmacology of drugs used

Relevant guidelines

Skills:

Performance and interpretation of spirometry.

Interpretation of other appropriate Lung Function Tests

Interpretation of Chest Radiology

Special investigations, including bronchoscopy

Use of inhaled and nebulised drug therapy.

3 Haemoptysis

Objectives

Be competent to undertake specialist assessment and form a structured differential diagnosis in patients with haemoptysis leading to appropriate further investigation and management

Candidate must have experience of patients presenting with:

ohaemoptysis in outpatient setting

oacute severe haemoptysis in acute/emergency admissions unit setting (minimum of 2 years)

Be able to manage the patient with haemoptysis effectively

Knowledge

Causes of haemoptysis

How to assess severity and formulate diagnostic strategy

How to formulate management plan, appropriate to degree of urgency

Need for interventional radiology/surgery

Relevant guidelines

Skills:

Interpretation of Chest Radiology

Bronchoscopy

Resuscitation, including basic airway skills

4 Pleuritic Chest Pain

Objectives:

Be competent to undertake specialist assessment and form structured differential diagnosis in patients with pleuritic chest pain

Candidate must have experience in dealing with patients presenting with

-chronic symptoms in outpatient department

-acute symptoms in acute/emergency admissions unit

(minimum of 2 years)

Be able to manage the patient with pleuritic chest pain effectively

Knowledge:

Causes of pleuritic chest pain

Understand pathogenesis of causes

Differential diagnosis of causes

How to formulate a plan of investigation, including appropriate use of ultrasound, closed and CT-guided pleural biopsy and Medical Thoracoscopy

Treatments and Management

Pharmacology of drugs

Relevant guidelines

Skills:

Interpretation of Chest Radiology including Chest XRay, V/Q scans, CT scans, CTPA scans

Pleural biopsy

Ultrasound

Medical Thoracoscopy (knowledge of; some candidates may gain experience in.

5 Abnormal Chest X-Ray

Objectives:

Be competent to assess and form differential diagnosis in patients with:

olocalized abnormalities on chest x-ray, for instance mass lesions

odiffusely abnormal chest x-ray, for instance interstitial pulmonary fibrosis

Candidate must have experience in dealing with patients presenting with the following throughout training:

oabnormal chest x-ray in outpatient department

oabnormal chest xray in acute/emergency admissions unit

Be able to formulate an appropriate plan for investigation and management

Knowledge:

Causes of abnormal Chest X-Ray

Differential diagnosis of causes

Know and understand pathogenesis of causes

Know how to formulate plan for further investigation and management

Skills:

Interpretation of Chest Radiology

B. Practical Procedures ILOs

1 – Advanced Life Support

Objectives:

Be competent to carry out and supervise effective resuscitation

Knowledge:

Causes of cardiopulmonary arrest

Principles of cardio-pulmonary resuscitation

Organ donation issues

Relevant guidelines

Skills:

Be proficient and competent in basic and advanced life support

Be proficient and competent in the use of defibrillators

Be competent in judging when ALS is not appropriate

Candidates must pass the ALS (UK)

Candidates' JRCPTB training portfolio/DOTS must show they have performed successful resuscitation

2 – Bronchoscopy

Objective

Be safe, efficient and competent at fiberoptic bronchoscopy and relevant associated techniques

Knowledge

Indications for fiberoptic bronchoscopy

Safe sedation for bronchoscopy

Techniques of fiberoptic bronchoscopy

Bronchoalveolar lavage

Transbronchial biopsies

Be aware of more advanced diagnostic and therapeutic bronchoscopic techniques

Patient consent and adequate explanation of risks and benefits

Relevant guidelines

Infection control/safety at work issues

Skills:

Be competent in safely performing fiberoptic bronchoscopy. A minimum of 200 should be recorded in the training portfolio/DOTS. Initially the candidate will be an observer andsubsequently perform bronchoscopy under supervision, with appropriate increasing independence as training progresses

Candidates should not bronchoscope unsupervised until at least 150 supervised bronchoscopies have been undertaken and their educational supervisor has assessed them as competent

C. Obligatory ILOs

1: Asthma

Knowledge

• Definition, classification (including clinical forms, phenotypes, staging and level of control) and aetiology of asthma.

• Epidemiology and pathophysiology of asthma, including mechanisms of

inflammation, structural changes involved, pathology in allergic and non-allergic asthma, relationship between pathology and asthma severity

• Risk factors for asthma, including host and environment factors

• Genetics of asthma

• Relevant investigations including lung function testing (including bronchodilator and bronchoprovocation tests, as well as

peak flow monitoring), chest X-ray, CT, nuclear techniques, exhaled NO, skin allergy testing, serum allergy testing and bronchoscopy

• Knowledge of possible differential diagnoses, including early childhood asthma, occupational asthma, vocal cord dysfunction, gastro-oesophageal reflux, upper respiratory tract disorders and COPD

• Sport and asthma

• Management of asthma and relevant therapeutic measures, including pharmacology of the drugs used in asthma treatment, patient education and the development of a written asthma management plan

• Alternative and complementary medicine for asthma

• Allergen-specific immunotherapy (hyposensitisation)

Skills

• Application of the above knowledge

• Evaluation of functional status including bronchodilator and bronchoprovocation tests and disability due to asthma

• Allergy testing

• Bronchoscopy

• Prescription of medication according to level of control

• Patient education including demonstrating use of inhaler devices

Behaviour and attitudes

• Multidisciplinary approach

2: COPD

Knowledge

• Definition, classification and aetiology of COPD, chronic bronchitis and emphysema and awareness of its heterogeneity

• Epidemiology and pathophysiology of COPD, including mechanisms of inflammation, structural changes and cell damage and repair

• Risk factors for COPD, including tobacco smoke and anti-protease deficiency (including physiological role of alpha-1-antitrypsin and its genetic characteristics, role of other anti-protease inhibitors, liver disease in antiprotease deficiency)

• Knowledge of possible differential diagnoses /co-existent disorders, including asthma, upper respiratory tract disorders, gastro-oesophageal reflux, obliterative bronchiolitis, bronchiectasis.

• Relevant investigations including spirometry, other relevant lung function tests, arterial blood gas analysis, peak flow monitoring, bronchodilator and bronchoprovocation testing.

The use of X-Ray, CT, ultrasound, nuclear techniques and exhaled NO, serum alpha-1-antitrypsin testing, pulmonary artery catheterisation

• Management of COPD including relevant therapeutic measures. Methods of oxygen supplementation including long-term oxygen therapy, non-invasive and mechanical ventilation, pulmonary rehabilitation and early discharge/hospital at home schemes.

Pharmacology of drugs used. Patient

education. Peak flow monitoring.Indications for hospitalisation.Alpha-1-antitrypsin supplementation therapy. Relevant vaccinations

• Management of related complications, including pneumothorax, respiratory failure, pulmonary arterial hypertension and corpulmonale, as well as systemic effects of COPD

Skills

• Application of the above knowledge

• Evaluation of functional status and disability due to COPD

• Assessment of suitability for lung volume reduction surgery and transplantation where appropriate

• Bronchoscopy

• Prescription of medication according to level of control

• Non-invasive ventilatory support

Behaviour and attitudes

• Multidisciplinary approach

<u>3: Bronchiectasis and other airway diseases</u>

Knowledge

• Definition, classification and aetiology of bronchiectasis, acute and chronic bronchitis, bronchiolitis, respiratory tract stenosis and

tracheobronchomalacia, tracheo-oesophageal fistula, upper respiratory tract disorders, vocal cord dysfunction, foreign body aspiration, gastro-oesophageal reflux

• Epidemiology and pathophysiology of these disorders

• Knowledge of possible differential diagnoses

• Knowledge of surgical indications and referral

• Relevant investigations, including X-ray, CT, nuclear techniques, exhaled NO, arterial blood gas analysis, and bronchoscopy including bronchography.

• Management including relevant therapeutic measures and physiotherapy

• Methods of oxygen supplementation including long-term oxygen therapy, non-invasive and mechanical ventilation

• Pharmacology of drugs used

• Patient education

• Peak flow monitoring

• Indications for hospitalisation

• Relevant vaccinations

• Relevant microbiology

Skills

• Application of the above knowledge

• Evaluation of the functional status and disability due to bronchiectasis and other airway diseases

• Assessment of suitability for surgery where appropriate

• Prescribing physiotherapy

• Bronchoscopy

• Interventional bronchoscopic techniques, e.g. stent placement.

• Prescription of medication according to level of control

• Non-invasive ventilation.

Behaviour and attitudes

• Multidisciplinary approach.

4: Cystic Fibrosis (CF)

Knowledge

• Definition, classification and aetiology of respiratory and non-respiratory manifestations of CF (including massive haemoptysis,

pneumothorax, gastrointestinal disease, diabetes, problems of fertility and pregnancy and psychosocial problems)

• Epidemiology and pathophysiology of CF

• Relevant investigations (including microbiological investigations)

• Non-invasive imaging modalities: chest X-ray, CT, MR.

• Related complications such as haemoptysis, pneumothorax, respiratory failure

• Pharmacology of inhaled, oral and systemic drugs used

• Chest physiotherapy techniques

• Nutrition

• Indications for lung transplantation

• Nutrition

Skills

• Application of the above knowledge

• Management of respiratory and nonrespiratory manifestations and their complications

• Interpretation of sputum microbiology

• Evaluation of functional status

• Patient education

Behaviour and attitudes

• Communication with patients and family

• Collaboration with a specialised CF-centre

• Multidisciplinary team approach

5: Smoking cessation/respiratory disease prevention

Knowledge

• Effects of smoking on the health of the individual in relation to lung and other disease

• Burden of smoking on health from a global perspective (health and economy)

• Beneficial effects of smoking cessation in preventing lung and other disease

• Treatment modalities for smoking cessation

• Teaching methods available for smoking cessation

• Effect of vaccination (e.g. against Influenza and Pneumococcus) on lung disease Infection control in relation to preventing lung infections

• Health and safety measures in workplaces

Skills

• Application of the above knowledge

• Management of smoking cessation therapy (pharmacological as well as nonpharmacological) in groups and in individuals

• Performance and supervision of vaccination

• Inspection of workplaces for health hazards

Behaviour and attitudes

• Non judgmental approach

6: Imaging techniques

Knowledge

• Basic principles of plain chest radiography, CT, MRI, PET-CT, HRCT, ultrasound and nuclear techniques

• Radiological thoracic anatomy

• Radiological features of common pulmonary and pleural diseases

• Indications for particular imaging techniques - for instance thin-slice CT for parenchymal lung disease, Mediastinal window settings for central lesions and ultrasound for pleural effusions

• Value of imaging other organs/organ systems, for example, bone scans

• Principles of radiation hazards

• Contra-indications for CT with contrast e.g. metformin therapy

• Contra-indications for MRI e.g. pace-maker in situ

• Indications for CT/ultrasound-guided biopsies

Skills

• Interpretation of plain chest radiographs (PA, AP and lateral views)

• Interpretation of CT scans – identification of mass lesions, consolidation, collapse, mediastinal/hilar lymphadenopathy, interstitial lung disease, hyperinflation/air-trapping, bronchiectasis, ground-glass shadowing, pneumothorax and pleural effusions/plaques

• Operation of portable bed-side ultrasound scanner to facilitate pleural aspiration/ drainage

Behaviour and attitudes

• Awareness of radiation risks, especially in relation to pregnancy

- **Multidisciplinary approach with radiologists, surgeons, oncologists and pathologists**

7: Bronchoscopy

Knowledge

- **Normal and variant bronchial anatomy**
- **Technical aspects of the flexible and rigid bronchoscope**
- **Indications and contraindications for bronchoscopy and associated techniques**
- **Safe sedation and local anaesthesia**

Skills

- **Safe administration of intravenous sedative**
- **Safe application of local anaesthetic**
- **Reversal of excessive sedative effect**
- **Introduction and manipulation of bronchoscope to subsegmental level**
- **Monitoring by oximetry**
- **Bronchial biopsy**
- **Transbronchial lung biopsy**
- **Measures to deal with bleeding after biopsy**
- **Transbronchial needle aspiration**
- **Broncho-alveolar lavage**
- **Endobronchial ultrasound examination**
- **Interventional techniques including fluorescence bronchoscopy, brachytherapy, endobronchial radiotherapy, laser treatment, electrocoagulation, cryotherapy, photodynamic therapy and stent placement**
- **Rigid bronchoscopy**
- **Cleaning the bronchoscope**
- **Infection control**
- **Transoesophageal ultrasound examination**

8: Skin testing (tuberculin and allergy tests)

Knowledge

- **Indications for tuberculin and allergy tests**

- **Types of tuberculin and allergen tests available**
- **Awareness of contraindications and precautions associated with tuberculin and allergy testing**
- **Protocols for treatment of anaphylaxis**

Skills

- **Application of the above knowledge**
- **Appropriate selection of patients for tuberculin and allergy testing**
- **Tuberculin and allergy testing, techniques of intra-dermal and prick testing and interpretation of results**