AMRITA
VISHWA VIDYAPEETHAM

A Multi Campus University with 'A' Grade Accreditation by NAAC

AMRITA SCHOOL OF MEDICINE

Amrita Centre for Allied Health Sciences

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CURRICULUM
B.Sc Respiratory Therapy

A Super Speciality Tertiary Care Hospital Accredited by ISO 9001-2008, NABL & NABH

Our Chancellor

SPIRITUAL PRINCIPLES IN EDUCATION

"In the gurukulas of ancient rishis, when the master spoke it was love that spoke; and at the receiving end disciple absorbed of nothing but love. Because of their love for their Master, the disciples' hearts were like a fertile field, ready to receive the knowledge imparted by the Master. Love given and love received. Love made them open to each other. True giving and receiving take place where love is present. Real listening and 'sraddha' is possible only where there is love, otherwise the listener will be closed. If you are closed you will be easily dominated by anger and resentment, and nothing can enter into you".

"Satguru Mata Amritanandamayi Devi"

Introducing AIMS

India is the second most populous nation on earth. This means that India's health problems are the world's health problems. And by the numbers, these problems are staggering 41 million cases of diabetes, nearly half the world's blind population, and 60% of the world's incidences of heart disease. But behind the numbers are human beings, and we believe that every human being has a right to high-quality healthcare.

Since opening its doors in 1998, AIMS, our 1,200 bed tertiary care hospital in Kochi, Kerala, has provided more than 4 billion rupees worth of charitable medical care; more than 3 million patients received completely free treatment. AIMS offers sophisticated and compassionate care in a serene and beautiful atmosphere, and is recognized as one of the premier hospitals in South Asia. Our commitment to serving the poor has attracted a dedicated team of highly qualified medical professionals from around the world.

The Amrita Institute of Medical Sciences is the adjunct to the term "New Universalism" coined by the World Health Organization. This massive healthcare infrastructure with over 3,330,000 sq. ft. of built-up area spread over 125 acres of land, supports a daily patient volume of about 3000 outpatients with 95 percent inpatient occupancy. Annual patient turnover touches an incredible figure of almost 800,000 outpatients and nearly 50,000 inpatients. There are 12 super specialty departments, 45 other departments, 4500 support staff and 670 faculty members.

With extensive facilities comprising 28 modern operating theatres, 230 equipped intensive-care beds, a fully computerized and networked Hospital Information System (HIS), a fully digital radiology department, 17 NABL accredited clinical laboratories and a 24/7 telemedicine service, AIMS offers a total and comprehensive healthcare solution comparable to the best hospitals in the world. The AIMS team comprises physicians, surgeons and other healthcare professionals of the highest caliber and experience.

AIMS features one of the most advanced hospital computer networks in India. The network supports more than 2000 computers and has computerized nearly every aspect of patient care including all patient information, lab testing and radiological imaging. A PET (Positron Emitting Tomography) CT scanner, the first of its kind in the state of Kerala and which is extremely useful for early detection of cancer, has been installed in AIMS and was inaugurated in July 2009 by Dr. A. P. J. Abdul Kalam, former President of India. The most recent addition is a 3 Tesla Silent MRI.

The educational institutions of Amrita Vishwa Vidya Peetham, has its Health Sciences Campus in Kochi, the Amrita School of Medicine, the Amrita Centre for Nanosciences, the Amrita School of Dentistry, the Amrita College of Nursing, and the Amrita School of Pharmacy, committed to being centres of excellence providing value-based medical education, where the highest human qualities of compassion, dedication, purity and service are instilled in the youth. Amrita School of Ayurveda is located at Amritapuri, in the district of Kollam. Amrita University strives to help all students attain the competence and character to humbly serve humanity in accordance with the highest principles and standards of the healthcare profession.

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Part I – Rules and Regulations

Part I
Rules and Regulations

Under Graduate Programmes (Bachelor of Sciences)

I.1. Details of Under Graduate Courses :			
Sl.No.	**Course**	**Duration**	**Conditions of Eligibility for admission to the course**
1	Medical Laboratory Technology (MLT)	4 years	Pass in plus Two with 50% marks with Physics, chemistry and Biology
2	Medical Radiologic Technology (MRT)	4 Years	First class in plus two with Mathematics, Physics, Chemistry, and Biology
3	Emergency Medical Technology	3 Years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
4	Anaesthesia Technology	3 Years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology
5	Respiratory Therapy (RT)	3 Years + one year Internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology
6	Dialysis Therapy	3 Years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology
7	Physician Assistant	3 years + one year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
8	Cardio Vascular Technology (CVT)	3 Years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
9	Echocardiography Technology	3 Years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
10	Cardiac Perfusion Technology (CPT)	3 Years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
11	Diabetes Sciences	3 years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
12	Optometry	3 Years + One year Internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
13	Bachelor of Audiology & Speech Language Pathology (BASLP)	3 years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
14	Neuroelectro-physiology	3 years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
15	Operation Theatre Technology	3 years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.
16	Intensive Care Technology	3 years + One year internship	Pass in plus two with 50% marks in Physics, Chemistry and Biology.

I.2. Medium of Instruction:

English shall be the medium of instruction for all subjects of study and for examinations.

I.3. Eligibility:

Generally Science Graduates with Physics, Chemistry, and Biology are eligible for admission to the Under Graduate Courses except in respect of certain specialties for which other qualification or subjects are specifically called for. Essential qualifications for eligibility are mentioned under clause I.1

II. General Rules:

Admissions to the courses will be governed by the conditions laid down by the University from time to time and as published in the Regulations for admissions each year.

II.1. Duration of the Course

Duration details are mentioned under clause No.I.1 of this booklet.

Duration of the course	: 4 Years (3 years + 1 year Internship except for courses at serial number 1 and 2 in clause I.1)
Weeks available per year	: 52 weeks
Vacation / holidays	: 5 weeks (2 weeks vacation + 3 weeks calendar holidays)
Examination (including preparatory)	: 6 weeks
Extra curricular activities	: 2 weeks
Weeks available	: 39 weeks
Hours per week	: 40 hours
Hours available per academic year	: 1560 (39 weeks x 40 hours)

Internship wherever specified are integral part of the course and needs to be done in Amrita Institute of Medical Sciences, Kochi itself.

II.2. Discontinuation of studies

Rules for discontinuation of studies during the course period will be those decided by the Chairman /Admissions, Amrita School of Medicine, and Published in the "Rules and Regulations" every year.

II.3. Educational Methodology

Learning occurs by attending didactic lectures, as part of regular work, from co-workers and senior faculty, through training offered in the workplace, through

reading or other forms of self-study, using materials available through work, using materials obtained through a professional association or union, using materials obtained on students own initiative, during working hours at no cost to the student.

II.4. Academic Calendar

Course will follow an annual scheme as per details mentioned under:

FIRST YEAR

Commencement of classes	– August 2019
First sessional exam	– November 2019
Second sessional exam	– February 2020
Model Exam (with practical)	– May - June 2020 (one week study leave)
University exam (with practical)	– June - July 2020 (10 days study leave)
Annual Vacation	– 3 weeks after the University examination.

SECOND YEAR

Commencement of classes	– August 2020
First sessional exam	– January 2021
Model Exam (with practical)	– May - June 2021 (one week study leave)
University exam (with practical)	– June - July 2021 (10 days study leave)
Annual Vacation	– 2 weeks after the University examination

THIRD YEAR

Commencement of classes	– August 2021
First sessional exam	– January 2022
Model Exam (with practical)	– May 2022 (one week study leave)
University exam (with practical)	– June 2022 (10 days study leave)
Annual Vacation	– 1 week after the University examination.
Date of completion of third academic year	– 31st July 2022

INTERNSHIP

Commencement of internship	– 01 August 2022
Completion of internship	– 31 July 2023

III. Examination Regulations:

III.1. Attendance:

75% of attendance (physical presence) is mandatory. Medical leave or other types of sanctioned leaves will not be counted as physical presence. Attendance will be counted from the date of commencement of the session to the last day of the final examination in each subject.

III.2. Internal Assessment:

For the first year at least three sessional examinations in theory and preferably one practical examination should be conducted in each subject. The following second/third year shall have one sessional and one model examination.

1. The period for sessional examinations of first academic year are as follows:

First Sessional Exam	: November
Second Sessional Exam	: February
Model Exam	: May /June

2. The period for sessional examinations of second and third academic year are as follows:

Sessional Exam	: January
Model Exam	: May /June

3. The last internal assessment examination will be the model examination which shall follow the pattern of the University Examination. Average of best of two examinations and the marks obtained in assignments/viva/practical also shall be taken to calculate the internal assessment.
4. A candidate should secure a minimum of 50% marks in the internal assessment in each subject (separately in theory and practical) to be eligible to appear for the University examination.
5. Each student should maintain a logbook and record the procedures they do and the work patterns they are undergoing. It shall be based on periodical assessment, evaluation of student assignment, preparation for seminar, clinical case presentation, assessment of candidate's performance in the sessional examinations, routine clinical works, logbook and record keeping etc.
6. Day to day assessment will be given importance during internal assessment, Weightage for internal assessment shall be 20% of the total marks in each subject.

7. Pre-University examinations (model exam) shall be held three to four weeks prior to the University Examination. Final internal assessment report shall be made available to the Principal ten days prior to the commencement of the university examination.

III.3. University Examinations:

i. University Examination shall be conducted at the end of every academic year. A candidate who satisfies the requirement of attendance and internal assessment marks, as stipulated by the University shall be eligible to appear for the University Examination.

ii. One academic year will be twelve months including the days of the University Examination. Year will be counted from the date of commencement of classes which will include the inauguration day.

iii. The minimum pass marks for internal assessment is 50% and for the University Examination is 50%. The student should score a total of 50% (adding the internal and external examination (University Examination)) to pass in each subject (separately for theory and practical)

iv. If a candidate fails in either theory or practical paper, he/she has to reappear for both the papers (theory and practical)

v. Maximum number of attempts permitted for each paper is five (5) including the first attempt.

vi. The maximum period to complete the course shall not exceed 6 years from the date of enrollment for the course.

vii. All practical examinations will be conducted in the respective clinical areas.

viii. Number of candidates for practical examination should be maximum 12 to 15 per day

ix. One internal and one external examiner will jointly conduct the theory evaluation and practical examination for each student during the final year.

III.4. Eligibility to appear university Examination:

A student who has secured 50% marks for Internal Assessment is qualified to appear for University Examination provided he/she satisfies percentage of attendance requirement as already mentioned at the III (1).

III.5. Valuation of Theory – Revaluation Papers:

1. Valuation work will be undertaken by the examiners in the premises of the Examination Control Division in the Health Sciences Campus.
2. Failed candidates will have the option of revaluation for all the University examinations. Fees for revaluation will be decided by the Principal from time to time.

3. Application for revaluation should be submitted within 5 days (or the time as decided by the Principal) from date of result of examination declared and it should be submitted to the office with payment of fees as decided by the Principal.

III.6. Supplementary Examinations:

Every main University examination will be followed by a supplementary examination which will normally be held within four to six months from the date of completion of the main examination.

As stipulated under clause No. III.2 under Internal Assessment, HOD will hold an internal examination three to four weeks prior to the date of the University Examination. Marks secured in the said examination or the ones secured in the internal examination held prior to the earlier University Examination whichever is more only will be taken for the purpose of internal assessment. HODs will send such details to the Principal at least ten days prior to the date of commencement of University examination.

Same attendance and internal marks of the main examination will be considered for the supplementary examination, unless the HOD furnishes fresh internal marks and attendance after conducting fresh examination.

Students who have not passed / cleared any subjects in the first University examination will be permitted to attend the second year classes and also eligible to appear for second year university examination along with first year supplementary examination. However, he / she can appear for the third (final) year university examination, only if he / she clear all the subjects in the first as well as in the second year examinations.

Students of supplementary batches are expected to prepare themselves for the University Examinations. No extra coaching is expected to be provided by the Institution. In case at any time the Institution has to provide extra coaching, students will be required to pay fees as fixed by the Principal for the said coaching.

III.7. Rules regarding carryover subjects:

A candidate will not be permitted to continue the second and third year respectively of the course if he/she has failed in more than 3 subjects in the first or second year university examinations.

A candidate must have passed in all subjects of all the three years to become eligible to undergo compulsory internship of one year. For the candidates who have not passed all the subjects the duration of the third year shall be extended until they become eligible to undergo compulsory internship subject of course to the conditions mentioned under III.3.v &vi of these Rules.

IV. Criteria for Pass in University Examination - Regulations:

IV.1. Eligibility criteria for pass in University Examination:

In each of the subjects, a candidate must obtain 50% in aggregate for a pass and the details are as follows:

- A separate minimum of 50% for Internal Assessment.
- 50% in Theory & 50% in Viva.
- A separate minimum of 50% in aggregate for Practicals / Clinics (University Examinations).
- Overall 50% is the minimum pass in subject aggregate (University Theory + Viva + Practicals + Internal Assessment).

IV.2. Evaluation and Grade:

1. Minimum mark for pass shall be 50% in each of the theory and practical papers separately (including internal assessment) in all subjects except English.
2. A candidate who passes the examination in all subjects with an aggregate of 50% marks and above but less than 65% shall be declared to have passed the examination in the second class.
3. A candidate who passes the examination in all subjects in the first attempt obtaining not less than 65% of the aggregate marks for all the three years shall be declared to have passed the examination with First Class.
4. A candidate who secures an aggregate of 75% or above marks is awarded distinction. A candidate who secures not less than 75% marks in any subject will be deemed to have passed the subject with distinction in that subject provided he / she passes the whole examination in the first attempt.
5. A candidate who takes more than one attempt in any subject and pass subsequently shall be ranked only in pass class.
6. A Candidate passing the entire course is placed in Second class / First class / Distinction based on the cumulative percentage of the aggregate marks of all the subjects in the I, II and III (Final) university examinations
7. Rank in the examination: - Aggregate marks of all three year regular examinations will be considered for awarding rank for the B.Sc Graduate Examination.

V. Internship:

V.1. Eligibility for Internship - Regulations:

Wherever internship is a part of the curriculum, students will have to do the internship in Amrita Institute of Medical Sciences, Kochi itself. A candidate must have passed in all subjects to become eligible to undergo compulsory internship of one year or a period fixed in the curriculum.

"Internship has to be done continuously for a period provided in the syllabus except in extra ordinary circumstances where subject to the approval of the Principal the same may be done in not more than two parts with an interruption not exceeding six months. In any case Internship shall be completed within 18 months from the date of acquiring eligibility to do the internship.

The students will be posted in Amrita Institute of Medical Sciences, Kochi and Amrita Institute of Medical Sciences, Faridabad, if necessary, during final year and internship period.

V.2. Attendance and leave details during Internship:

For 30 days of duty an intern will be eligible for casual leave and weekly off. A Student will become eligible to receive his/her degree only after completion of internship to the complete satisfaction of the Principal.

VI. General considerations and teaching / learning approach:

There must be enough opportunities to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching-learning process.

Proper records of the work should be maintained which will form the basis for the students assessment and should be available to any agency who is required to do statutory inspection of the school of the course.

VII. Project:

Each student should submit a project in consultation with HOD and guidance under Project Guide, 3 months prior to their final year university exam. The student will be eligible to appear for the final year examination only after submission of the project.

VIII. Maintenance of Log Book

- Every graduate student shall maintain a record of skills he/she has acquired during the training period certified by the various Heads of Departments/Program Coordinator under whom he/she has undergone training.
- In addition, the Head of the Department shall involve their graduate students in Seminars, Journal Club, Group Discussions and participation in Clinical, Clinical-Pathological meetings.
- The Head of the Departments/Program coordinator shall scrutinize the log-book in every month.
- At the end of the course, the student should summarize the contents and get the log book certified by the Head of the Department.

The log book should be submitted at the time of practical examination for the scrutiny of the Board of Examiners.

Part II
Syllabus

INTRODUCTION AND ADVANCEMENT

Respiratory Therapy is an allied medical speciality concerned with the evaluation and treatment of patients who have breathing difficulties and respiratory diseases. Respiratory Therapists are in great demand in Speciality hospitals and hospital related organizations to provide direct patient care to those with acute and chronic respiratory problems. The field of Respiratory Therapy is growing rapidly. Diagnosis and management of respiratory disorders needing intensive care, pulmonary rehabilitation, teaching and many more research opportunities are areas that offer opportunities to the Respiratory Therapists for professional growth and personal satisfaction. Respiratory Therapist can be seen in Intensive care units, pediatric and neonatal units, and operating rooms and especially in the emergency rooms. Respiratory Therapists are cardiopulmonary specialists with vast training in both heart and lung function. The Duration of course will be four years

History: Respiratory Therapy is a subset of anesthesia and has grown considerably through the past four decades. There was a time when Respiratory Therapists were on-the-job trained technicians, with little formal education. Their main function was to ensure safe oxygen use, to administer intermittent positive pressure breathing (IPPB) treatments, to perform cardiopulmonary resuscitation (CPR), and to operate negative pressure (iron lung) ventilators. They were initially titled Inhalation Therapists. With the advent of positive pressure mechanical ventilators, the more widespread hospital provision of Neonatal and Pediatric care, more sophisticated pulmonary function testing (PFT), a need for thoroughly trained clinical practitioners presented itself. Over the years "respiratory technicians" have evolved to being college and University trained personnel who assist the physician and teach registered nurses in assessing and treating patients. Invasive skills that Respiratory therapists must master include, but are not limited to; intubation, other advanced airway placement, arterial-line insertion, Cardiac Catheter advancement, intra-venous line insertion, Tracheostomy re-cannulation, naso-tracheal suction, and ABG's. These skills require a great deal of practice to master.

Advancement.

Respiratory therapists advance in clinical practice by moving from general care to the care of critically ill patients who have significant problems in other organ systems, such as the heart or kidneys. Respiratory therapists, especially those with a bachelor’s or master’s degree, also may advance to supervisory or managerial positions in a respiratory therapy department. Respiratory therapists in home health care and equipment rental firms may become branch managers. Some respiratory therapists advance by moving into teaching positions. Some others use the knowledge gained as a respiratory therapist to work in another industry, such as developing, marketing, or selling pharmaceuticals and medical devices.

Employment:

Faster-than-average employment growth is projected for respiratory therapists. Job opportunities should be very good, especially for respiratory therapists with cardiopulmonary care skills or experience. The vast majority of job openings will continue to be in hospitals. However, a growing number of openings are expected to be outside of hospitals, especially in home health care services, offices of physicians or other health practitioners, consumer-goods rental firms, or in the employment services industry as a temporary worker in various settings.

SYLLABUS

FIRST YEAR

ANATOMY

PAPER-1

COURSE OBJECTIVE:

An outline of anatomy with special emphasis on applied aspects is provided to the students for better understanding of the technical and diagnostic procedure.

Topic No:	Name of the Topic	No of Hours
1.	**The human body as a whole** Definition Sub divisions of anatomy Terms of location and positions Fundamental planes, Vertebrate structure of man Organization of body cells and tissue.	5 hours
2.	**Locomotion and Support** The Skeletal System Types of bones & Cartilages Skull as a whole- foramen magnum & maxilla in detail Structure and growth of bones Divisions of the skeleton, Appendicular skeleton, Axial skeleton Upper & lower limbs- bones, blood flow. Scapula & Axilla Name of all the bones and their parts Joints: Classification, Types of movements with examples.	5 hours
3.	**Muscles** Structure, Classification ,Muscles of abdominal wall Muscles of respiration , Diaphragm, Muscles of head and neck	5 hours
4.	**Thorax** Thoracic cavity, wall of thorax, mediastinum, surface marking of the thorax, thoracic duct. Clinical Anatomy of Thorax	5 hours
5.	**Anatomy of nervous system** Introduction and divisions of nervous system Central nervous system, Spinal cord, Reflex arc Peripheral nervous system – organization& structure of a typical spinal nerve	5 hours
6.	**The Brain**: Location, gross features, parts, functional areas Hindbrain, Midbrain, fore brain Coverings of brain anatomy of cerebral blood supply& coverings	5hours

	Spinal cord –gross features, extent, blood supply and coverings Injuries to spinal cord and brain	
7.	**Anatomy of Cardiovascular system** **Gross anatomy & Structural features of the Heart and Great vessels**: **Heart :**Location, size, surface features, pericardium & valves All four chambers- Right Atrium, Venous area, Septum and atrial appendage Right Ventricle-structural features, inflow & out flow characteristics Left Atrium :structural features, venous area, Septum and appendage Left ventricle structural features, inflow & out flow characteristics Valves - valve apparatus, location, Structure & functions of each valve. Blood Supply of heart- coronary arteries, cardiac cycle Innervations-sympathetic and parasympathetic sensory Clinical Anatomy	5 hours
8.	**Great Vessels** Structure of blood vessels and its organization & musculature Aorta and systemic arteries & foetal circulation. Venous drainage- Inferior vena cava & Superior vena cava General plan of systemic circulation & collateral circulation. Pulmonary circulation - pulmonary artery & pulmonary vein Lymphatic drainage of the Heart.	**5** hours
9.	**Anatomy of the Respiratory system** Organs of Respiratory System Conducting portion: Nose –nasal cavity, paranasal air sinuses Larynx & pharynx Trachea, bronchial tree, lungs Alveoli. Clinical Anatomy.	**5** hours
10.	**Organization of the respiratory system** Muscles of Respiration Gross structure, histology, position and coverings of the lungs Pleura Pulmonary circulation – pulmonary arteries pulmonary veins & bronchial arteries Nerve supply to the respiratory system	**5** hours

10.	**Anatomy of the digestive system** Components of the digestive system Alimentary tube. Anatomy of organs of digestive tube. Mouth, tongue, tooth, oesophagus, stomach Gastric secretion and regulation, Salivary gland, liver, biliary apparatus and its secretion, pancreas and pancreatic secretion, movements of intestine defecation, GI hormones malabsoption and	**5** hours

	Regulation. Small and large intestines.	
11.	**Excretory system** Kidneys-location, gross structure, blood supply and nerve supply. Organization of the renal system & clinical anatomy. Excretory ducts, ureters, urinary bladder, urethra & ureters	5 hours
12.	**Male & Female reproductive system** Testis, Duct system, prostate. Ovaries, uterine tubes, uterus, vagina, duct system, accessory organs	5 hours
13.	**Endocrine system** Endocrine glands and their positions Hormones and their functions Pituitary, thyroid, parathyroid, adrenal gland & gonad, islets of pancreas	5 hours
14.	**Genetics – Karyotyping, chromosomal anomalies**	5 hours
15.	**Special Senses** Eye, ear and skin. Clinical Anatomy	5 hours
16.	**Lymphatic organs** Tonsil, Spleen, thymus. Clinical Anatomy	5 hour

Total Theory Hours = 80

HISTOLOGY

1.	**General Slides:** Hyaline cartilage. Fibro cartilage. Elastic cartilage. T.S&L.S of bone. Blood vessels. Tonsils, Spleen, Thymus. Lymph node, Epithelial tissue. Skeletal and cardiac muscle. Peripheral nerve and optical nerve	3 hours
2.	**Systemic Slides**: G.L.T –all Lung Parenchyma Kidney pituitary Endocrine- Adrenal, pancreas, pituitary, thyroid and parathyroid Uterus, ovary, testis.	3 hours

Demonstrations

1.	Demonstrations of all bones, Showing parts joints, X-rays of all normal bones and joints.	
2.	Demonstration of brain and spinal cord, Histology of cerebrum.	
3.	Demonstration to illustrate normal angiograms.	
4.	Demonstration of surface features & interior of the heart.	
5.	Demonstration of aorta and its branches.	
6.	Histology of cardiac muscles and artery.	
7.	Muscles: Striations and classification of muscle.	
8.	Diaphragm-Insertion, openings, relations.	
9.	Histology of lungs & x rays, stages of respiration.	
10.	Identification of Kidney, spleen, liver, stomach, pancreas.	
	Total hours for demonstration	4

Total lecture hours allotted for theory and demonstration- Anatomy – 100 hours/year

PHYSIOLOGY

PAPER - 2

Topic No:	Name of the Topic	No of hours
	BLOOD: Composition properties and functions of blood - Intro.	
1.	**R.B.C**: Size, Shape, functions, count, physiological variations of RBC count. Polycythemia, erythropoiesis. Haemoglobin function, concentration, physiological variation and concentration & methods of determination of haemoglobin. Life span & destruction.	1 hour
2.	**W.B.C**: Functions, production, life span count, differential count leukocytosis, leucopenia , leukemia .	1 hour
3.	**Platelet:** Size, shape, count production, thrombocytopenic purpura, bleeding time and clotting time.	1 hour
4.	**Plasma Proteins**: Concentration, production, albumin, globulin, fibrinogen. Prothrombin & functions of plasma proteins	1 hour
5.	**Blood Grouping**: ABO & Rh grouping, Criteria of classification Antigen and antibodies, Genetics and inheritance, percentage of distribution. Determination of blood groups.LAN Steiner's Law & Significance of blood group	2 hours
6.	**Blood transfusion**: Indication, general qualities of a donor Matching of donors blood with recipients blood Universal donor and recipient concept. Blood grouping or typing, cross matching. Mismatched blood transfusion – Causes and complication. Rh factor and Rh factor incompatibility Transfusion and erthroblastosis and foetalis.	2 hours
7.	**Anemia:** Definition, classification, major causes Types of anemia, Effects of anemia on body treatment	2 hours
8.	**ESR** and **PCV:** Determination, definition, values Variation factors affecting significance.	1 hours
9.	**Blood Volume:** Normal value, determination of blood volume and regulation of blood volume. Body fluid, pH, normal values, variation and regulation	1 hours
10	**Hemostasis** : vasoconstriction, platelet plug formation Blood coagulation- definition, clotting factors Mechanism of blood clotting-intrinsic and extrinsic factors Intravascular blood clotting, disorders of clotting & anticoagulants. Vitamin K Deficiency bleeding, purpura, haemophilia.	1 hour

11.	**Cardiovascular System:** Functions of cardiovascular system and blood circulation, Tissue perfusion and microcirculation Cardiac Cycle - Various phases , Cardiac output: definition and measurement - Regulation and control Heart rate and pulse, Stroke volume, Vascular distensibility and Functions of arterial and venous systems , Arterial pressure pulsations and its regulation, Venous return, Cardiac metabolism, Cardiac cycle with reference to the waveforms of pressure tracing□Heart as a pump, Physical characteristics of atrium, ventricles & valves, Mechanism of contraction. Organization of pacemaker & conduction system types of artificial pacemakers. Cardiac excitation and contraction. Specialized conduction tissues, Sinus node, Inter nodal tracts, AV node, bundle of his, Bundle branches, Nodal electricity, and Nervous control of HR.	5 hours
12.	**Cardio vascular regulatory mechanism** Local: Vasodilatation, Auto regulation(myogenic theory) Vasodilator metabolites. Kinins & vasoconstriction. Systemic: -□ Circulatory vasoconstrictors. Neural and hormonal regulatory mechanism, Cardio inhibitory center. Vasomotor center□Baro & chemoreceptors, Movements of fluids & dissolved solutes in the body□Control of stroke volume and cardiac out put□Specialization in individual circulation: Coronary circulation, Renal circulation□ Cerebral circulation, Pulmonary circulation, Cutaneous circulation. Coordinate cardiovascular responses-posture□Valsalva maneuver & exercise	5 hours
13.	**Basics of ECG:** Definition□Electrical conduction, normal and abnormal ECG. Interpretation of normal and abnormal ECGs	4 hours
14.	**Muscle Nerve Physiology:** Membrane and action potentials, Contraction & excitation of skeletal muscle and smooth muscle. Neuromuscular junction, transmission, neuromuscular junction, coupling, mechanism of muscle contraction, muscle tone, fatigue.	3 hours

1.	**Demonstration:** Recording of blood pressure Sphygmomanometer Measuring pulse rate (normal & following exercises) ECG description and drawing Demonstration of abnormal ECGs Auscultation of heart sounds and interpretation	5 hours

	Respiratory System□	
15.	**Introduction** to the respiratory system, physiological anatomy of respiratory system, muscles of respiration, pulmonary circulation, pulmonary capillary dynamics, and fluids in the pleural cavity respiratory passage ways. Functions of tracheobronchial tree, lower airway & alveoli, respiratory membrane	2 hours
16.	**Regulation of Respiration**: Stages of respiration, mechanism of normal and rigorous respiration, Respiratory centre, Chemical con-	5 hours

	trol of respiration, peripheral chemoreceptor system for control of respiration & role of oxygen in the respiratory activity. Regulation of respiration during exercise.	
17.	**Physical principles of gaseous exchange**: Diffusion of oxygen and carbon dioxide through the respiratory membrane. Physics of gas diffusion and gas partial pressures, Composition of alveolar air & its relation to atmospheric air Macrophages and surfactant, transportation of respiratory gases. Transportation of oxygen and carbon dioxide in blood and tissue fluids**.**	3 hours
18.	**Pulmonary Volumes and capacities:** Spirometry and spirogram,	4 hours
19.	**Role of Thorax in Respiration** : Forces opposing and favoring expansion of lungs, intra pulmonary pleural pressure Surface tension, recoil tendency of the chest wall & principles of elasticity. Effect of ventilation perfusion ratio on alveolar gas concentration Compliance & airway resistance, Shunting & dead space, Concept of physiologic shunt & shunt effect.	5 hours
20.	**Alveolar Ventilation & dead space**. The mucus blanket mucus & cilia, Lung – thorax relationship.	2 hour

Applied physiology of respiration

1.	Respiratory insufficiency- pathophysiology, diagnosis, oxygen therapy.	5 hours
2.	Hypoxia, Cyanosis, Asphyxia, Dyspnea and Respiratory organ failure	3 hours
3.	Artificial respiration & apnea	1 hour

Demonstration

1. 2. 3.	Spirometry & spirogram interpretation, stethoscope, monitoring oxygenation, physical examination Auscultation of the chest for lung sounds Description of normal findings, monitoring of blood pressure, ECG, Saturation, blood gases.	5 hours

	Endocrine System	
21.	**Hormone**: local and general hormones, properties of hormones, mechanism of action of hormones-AMP, major endocrine glands of body and their locations.	1 hour
22.	**Pituitary**: Situation master gland anterior and posterior Anterior pituitary hormones, functions of each one of them. Dwarfism, Acromegaly, Gigantism , regulation of secretion of each hormone Posterior pituitary: ADH, and oxytocin scare (Chemistry) functions, regulation of secretions, diabetes insidious	1 hour
23.	**Thyroid gland**: Physiological location, hormone secreted, functions, regulation of secretion. Endocrine disorders **Adrenal gland**: adrenal cortex-hormones secreted, gluco corticoids, mineralocorticoids, sex steroids, functions regulation of secretion	1 hour

	Aldosterone	
24.	**Adrenal Medulla**: Functions of adrenaline and nor adrenaline, regulation of secretion **Pancreas:** Hormones of pancreas, insulin, function and actions regulation of secretion, diabetes mellitus, regulation of□ secretion, regulation of blood glucose level, parathyroid gland□ PTH function and actions, regulation of secretion hypo and hyper secretion of PTH, regulation of secretion	1 hour
25.	**Nervous system:** Functions of nervous system, neuron structure, classification and properties, neuroglia, nerve fiber, conduction of impulses, transmission of impulses, factors affecting transmission.	1 hour
26.	**Synapse**: structure type properties **Receptors**: classification & properties. Reflex action: unconditioned properties of reflex action, spinal cord nerve tracts, ascending tracts, descending tracts, pyramidal tracts, extra pyramidal tracts, □ Functions of medulla pons, hypothalamic disorders□ Cerebral cortex lobes and functions, sensory cortex, medullary cortex, EEG	1 hour
27.	**Cerebrospinal fluid**: Formation circulation properties, composition and functions, hydrocephalus lumbar puncture□ **Autonomic nervous system**: sympathetic and parasympathetic distribution and functions	1 hour
28.	**Spinal Senses** **Vision**: structure, accommodation changes, field of vision, dark and light adaptation, visual cycle structure of retina, rhodes and cones structure and functions, visual pathway, Papillary reflexes and its pathway colour, colour blindness, tests for colour blindness **Hearing**: Outer middle and inner ear, cochlea, mechanism of hearing, auditory pathway, deafness. **Taste**: Taste buds, primary taste, pathway for taste **Smell**: Receptors, primary olfaction, olfactory pathway	2 hours

29.	**Metabolism and temperature regulation:** Regulation of body temperature-role of the hypothalamus, abnormalities of the body temperature regulation, fever.	2 hours
30.	**Digestive System:** Physiological anatomy of G.I.T, Structure and functions of salivary glands-saliva-properties, deglutition, structure and functions of the stomach, properties, composition and functions of gastric juice, regulation of gastric juice secretion, gastric digestion, functions of pancreas, composition, properties and functions of pancreatic juice, regulation and secretion of pancreatic juice Functions of Liver: properties composition and functions of bile□ regulation of bile secretion, gall bladder functions, functions of large intestine, regulation of intestinal secretion, composition and functions of success entericus, movements of small intestine –peristalsis, pendulum movements, rhythmic, movements movements of large intestine - digestion and absorption of carbohydrate□ digestion and absorption of protein, digestion and absorption of fat lipids defecation	3 hours

31.	**Mechanism of Urine Formation:** Organization and functions of renal system, renal circulation and glomerular filtration rate (GMR) Mechanism of urine formation and excretion, Renal function tests Ultra filtration criteria for filtration GFR, plasma fraction, determination of GFR, selective reabsorption, Mechanism of reabsorption glucose urea, Hydrogen ions , chloride ions and amino acids etc.TMG, tubular lead, renal threshold % of reabsorption of different substances, selective secretion. Properties and composition of normal urine, urine output abnormal constituents in urine, mechanism of urine concentration, Counter – current mechanisms- Micturition, diuretics artificial kidney Renal function tests-plasma clearance, actions of ADH aldosterone, and PTH of kidneys	3 hours
32.	**Excretory System -** Kidneys:- Nephron, Vasa recta, cortical and juxtamedullary nephrones, comparison, juxta glomerular apparatus-structure and functions, renal circulation peculiarities	1 hour
33.	**Reproductive system:** Puberty, functions of testis, spermatogenesis site, stages factors influencing semen, endocrine functions of testes - testosterone structure and function, female reproductive system ovulation, menstrual cycle, physiological changes during pregnancy, pregnancy test, parturition family planning methods; safe period pills, permanent methods, actions of estrogen, progesterone functions of placenta, lactation-composition of milk factors, controlling lactation	2 hours

Demonstration

1.	Study of microscopes and its uses	10 hours
2.	Collection of blood and haemocytometer	
3.	Haemoglobinometry	
4.	Determination of specific gravity of blood	
5.	White blood cell count	
6.	RBC counts	
7.	Determination of blood groups	
8.	Leishmans staining and differential WBC count	
9.	Determination of PVC (packed cell volume)	
10.	Calculation of blood indices	
11.	Fragility test for RBC	
12.	Determination of bleeding time	
13.	Determination of clotting time	
14.	Blood pressure recording	
15.	Auscultation of heart sounds	
16.	Artificial respiration, Determination of vital capacity	
17.	Stethography	
18.	Clinical examination of reflexes.	
19.	Effect of posture and exercise on BP and pulse.	
20.	Clinical examination of CVS	

Total Theory hours: 80
Demonstration : 20

Attention: Demonstration & Practical

* Practical classes will be only two hour after the theory portions; it will be an orientation class to the common procedures and equipments used in physiology.
* There will be no university practical examination for physiology

Total lecture hours allotted for theory and demonstration- Physiology – 100 hours/year

BIOCHEMISTRY

PAPER - 3

1.	**Introduction to apparatus:** Chemical Balance concept of molecular weight, atomic weight.	1 hour

	normality and molarities, standards.	
2.	**Atomic structure**: Valence, acids, bases, salts and indicators Concept of acid base reaction and hydrogen ion concentration, pH, pH meter pH buffers	2 hours
3.	**Chemistry of carbohydrates** - Structure , classification, examples	2 hours
4.	**Chemistry of proteins** - Structure , classification, examples	2 hours
5.	**Chemistry of Nucleic acids** - Structure , classification, examples	2 hours
6.	**Vitamins** - Classification, chemical nature, deficiency. Co-Enzymes form, biochemical role, sources, requirement, deficiency and toxicity of following vitamins – A, D, E, K Deficiency of thiamin Riboflavin, niacin, biotin, pyridoxine, pantothenic acid, folic acid , one carbon groups And B12 ascorbic acid	3 hours
7.	Cell structure and functions, sub cellular organelles, biomembrane	2 hours
8.	Digestion and absorption of nutrients & transport of irons.	2 hours
9.	**Enzymes:** Nature, co-enzymes, co-factors**,** classification, Mechanism of action, specificity of enzymes, active sites**,** enzyme kinetics, factors affecting enzyme activity, Km value and significance**,** enzyme inhibition-competitive, allosteric	2 hours
10.	**Chemistry of amino acids** –classification based on structure Ionic properties of amino acids, isoelectric pH, buffering action of amino acids & Proteins. Electrophoresis & Chromatography-brief mention on separation techniques, plasma proteins and immunoglobulin's.	2 hours
11.	**Chemistry and metabolism of carbohydrates** Classification – monosaccharide's, glucose, fructose galactose and mannose, derivatives like amino sugars, deoxisugars, glycosidic bond, disaccharides , lactoser, sucrose, maltose, polysaccharides, glycigen, detrins, glycosaminologlycans (basic structural features, functions only)	3 hours
12.	**Minerals:** Sources, Requirements absorption, biochemical role, deficiency and toxicity of following minerals , Ca & Phosphorus , role of PTH , 1.23 DHCC & CT, Trace elements-Zn , F , I, Se, Mg, Fe, Cu.	3 hours
13.	**Lipids: C**lassification with examples**,** Saturated & unsaturated fatty acids**,** Triacylglycerole phospho lipids Cholesterol-structure, synthesis, regulation, metabolic fate, bile acids and steroids from cholesterol	2 hours

14.	**Proteins and amino acids** Chemistry and metabolism, functions of proteins in the body. Essential and non essential amino acids, Peptides.	2 hours
15.	**Nucleic Acid:** Structure of purins, pyrimidines, nucleosides, and nucleotides.RNA and its different type functions DNA replication, DNA polymerace, DNA repairs. Gout, Lesch nyhan syndrome, Purine and pyramidine - catabolism and its clinical disorder.	2 hours

16.	**Blood glucose regulation** – action of insulin, glucagon's, cortisol, growth hormones. Diabetes mellitus-aetiology, biochemical abnormalities, symptoms and complications. Glycosurias-differential diagnosis of reducing sugars.	3 hours
17.	**Hemoglobin:** Synthesis and degradation	2 hours
18.	**Liver Function Tests**	2 hours
19.	**Metabolism: Interrelation** of carbohydrates, lipids, and amino acid metabolism, anaphylactic reactions.	2 hours
20.	**Maintenance of homeostasis & Acid base regulation** Acid and bases, PH buffers, Henderson hassle Bach's equation buffer capacity, acid and base in the body, plasma buffers respiratory and renal regulation of pH, acidosis and alkalosis Major causes and compensatory mechanism anion gap, assessment of acid and base status, fluid electrolyte balance-distribution of body water and disorders.	5 hours
21.	**Renal function Test:** Clearance test, test for tubular function, NPN , Urine analysis	2 hours
22.	Biochemistry of Cancer Mutagens, carcinogens, role in carcinogenesis, tumor markers and oncogens.	2 hours

Clinical Biochemistry

1.	Specimen collection : Collection of Blood, Urine, CSF, Other body fluids	2 hours
2.	Basic Principles of routine biochemical investigation	1 hour
3.	LFT and assessment	2 hours
4.	RFT and assessment	2 hours
5.	Evaluation of Important hormones	1 hour
6.	Cardiac Profile: Biochemical markers of Myocardial Infarction Basic Principles	2 hours
7.	Enzymes: Classification, Therapeutic significance	2 hours
8.	Nutrition : Nutrient requirement, Digestion absorption	1 hour
9.	Regulation and evaluation of acid base status	3 hours
10.	Principles and evaluation of Blood Gases & pH	2 hours
11.	Basic Principles and estimation of electrolytes	2 hours
		20 hours

Total Theory hours: 70
Clinics : 20

Total lecture hours allotted for theory and demonstration- Biochemistry – 90 hours/year

MICROBIOLOGY
Paper 4

Topic No	Name of the Topic	No of Hours
1.	Introduction & history of microbiology	1 hour
2.	Morphology and physiology of bacteria	1 hour
3.	Sterilization and disinfections	2 hours
4.	Normal Microbial flora of the human body Shape and arrangement, Special characteristics- spores, capsules, motility, reproduction.	1 hour
5.	Infection- source, source of entry, spread of infection. Two day special training in infection control practices at the bed side-by AIMS infection control department.	2 hours (2 days)
6.	Hospital acquired infections and prevention of hospital acquired infections, enteric infections, urinary tract infections, anaerobic infections, wound infections, yeasts and fungi.	2 hours
7.	Immunity, non-specific immunity, natural & acquired	1 hour
8.	Antigen antibodies, antigen anti-body reactions	1 hour
9.	Immune response	1 hour
10.	Hypersensitivity & allergy	1 hour
11.	Immunoprphylaxis	1 hour
12.	Antibiotics	1 hour
13.	Mycobacterium tuberculosis	1 hour
14.	General properties of virus & virology	1 hour
15.	Virus host interactions-virus infections	1 hour
16.	HIV / AIDS, other sexually transmitted infections	1 hour
17.	Medical mycology	1 hour
18.	Medical parasitology	1 hour
19.	Upper respiratory tract infections	2 hours
20.	Lower respiratory tract infections	3 hours

Practical and Demonstration

1.	Gram stain	1 hour
2. 3.	Acid fast stain Antibiotic susceptibility testing	2 hours
4.	Visit to CSSD and microbiology clinical laboratory (One week postings in rotation)	1 hour

Total Theory hours: 30

COMMUNITY MEDICINE

Paper- 5

Topic No	Name of the Topic	No of Hours
1.	Introduction to community medicine and concept of health	1 hour
2.	Concept of disease	1 hour
3.	Communicable disease (water born)	1 hour
4.	National health programmes – 1	1 hour
5.	Communicable disease (contact-born & zoonoses)	1 hour
6.	Health care delivery system including primary health care	1 hour
7.	Health care of the community	1 hour
8.	Occupational health control	1 hour
9.	National health programmes - 2	1 hour
10.	Management of public health administration	1 hour
11.	Socio-cultural factors in disease	1 hour
12.	Health education – 1	1 hour
13.	Biostatistics	2 hours
14.	Concepts of nutrition	1 hour
15.	Fundamentals of epidemiology	1 hour
16.	Scope of epidemiology	1 hour
17.	Communicable disease (air born)	1 hour
18.	Communicable disease (vector born)	1 hour
19.	Occupational health hazards – 1	1 hour
20.	Principles in public health administration	1 hour
21.	Occupational health hazards – 2	1 hour
22.	Occupational health control	1 hour
23.	RCH	1 hour
24.	IEC	1 hour
25.	Health education – 2	1 hour
26.	Research methodology - 1	1 hour
27.	Therapeutic diet	1 hour
28.	Health education- 3	1 hour
29.	Research methodology – 2	1 hour

Visit to Community Health Centers

1.	Visit to RHTC- PKR/NOM/APR/RM/SNT	1 day
2.	Visit to UHTC- PKR/NOM/APR/RM/SNT	1 day

Total Theory hours: 30

PSYCHOLOGY

Paper- 6

Topic No	Name of the Topic	No of Hours
1.	**Introduction to Psychology:** Early Origins, Different Schools of thoughts, Different branches in Psychology	1 hour
2.	**Methods in Psychology:** Introspection, Observation, Interview, Experimental Methods – Independent, dependent and extraneous variables, Case Study, Survey, Correlation Method, Rating Scales, Advantages and disadvantages of each method	1 hour
3.	**Biological Basis of Behavior:** Biological Psychology – Basics of genes, Methods of genetic study in psychology, Nervous System, Neurotransmitters, Glands	1 hour
4.	**Sensation and Perception:** Sensation definition, nature of sensation, Principles of sensation, Psychophysics – Absolute and Differential Threshold, Methods of Psychophysics, Sensory Adaptation, Basics of Visual Sensation, Auditory Sensation, Gustatory, Olfactory, Kinesthetic Sensations, Attention, Factors determining attention, Types of attention, Consciousness definition	2 hours
5.	**Perception :** Definition, Principles of perceptual Organization, Perceptual constancies, Depth perception, Monocular and binocular cues, Apparent motion, Factors affecting perception, Errors in perception	2 hours
6.	**Learning:** Definition, Theories of learning – Trial & error, Associative, Cognitive, Observational, Laws of Learning – Law of readiness, exercise, effect, primacy, recency, intensity. Classical conditioning- Unconditioned response, unconditioned stimuli, Conditioned stimuli, conditioned response, principles of conditioned learning. Operant conditioning- Definition, Reinforcement, types of reinforcement, schedules of reinforcement. 3 types of cognitive learning – latent, concept, insightful. Factors influencing learning – associated with the learner, material and the process. Transfer of learning – types of transfers, Study habits, SQ4R method**.**	3 hours
7.	**Thinking :** Definition, building blocks of thoughts – images, concepts, language, Reasoning, types of thinking, problem solving, steps in problem solving, strategies in problem solving – trial & error, algorithm, heuristics, information retrieval, Barriers to effective problem solving, Convergent & divergent thinking, Creative thinking – definition, stages, Language – definition, structure of language, behaviorist nativist, interactionist theory of language acquisition.	2 hours
8.	**Intelligence :** Definition, IQ, Classification of IQ, Mental Retardation, Types of Mental retardation, Theories of intelligence - Primary Mental Abilities, Two Factor Theory, Multifactor Theory, Theory of Multiple Intelligence, Three Dimensional Theory,	2 hours

	Crystallized & Fluid Intelligence , Triarchic Theory	
9.	**Motivation:** Human behavior and motives, process of motivation, characteristics of motivation, intrinsic, extrinsic, instincts, types – biological, social, personal, theories of motivation, frustration & conflicts, types of conflicts, loss of motivation, factors contributing to loss of motivation.	2 hours
10.	**Emotions:** Definition, Components, Theories of emotion, Changes during emotions, Emotional adjustment, Emotions in health and illness.	1 hour
11.	**Personality:** Definition, Development of personality, Types of personality, Theories of personality.	1 hour
12.	**Developmental Psychology:** Life span perspective, Nature of development, Principles of development, Factors influencing development, Stages of development.	1 hour
13.	**Psychological Assessment:** Definition, Types, Principles of test development, Characteristics, Psychological tests, Interpretation.	1 hour
14.	**Mental Health:** Concepts of mental hygiene and mental health, Definition, Characteristics of mentally healthy persons, Warning signs of poor mental health, Mental illness (schizophrenia, mood disorder, anxiety disorder), Life style and Mental Health.	1 hour
15.	**Stress:** Nature and source of stress, Types of stress- Pressure, Conflicts, and Frustration, Coping with stress, Stress and health.	1 hour
16.	**Counseling:** Definition, Principles and elements of counselling, Characteristics of counselor.	2 hours
17.	**Social Psychology:** Basics of person perception, attitudes, conformity, attribution, interpersonal attraction, and groups.	1 hour

Total Theory hours: 25

Second Year

APPLIED PATHOLOGY

Paper - 1

Topic No	Name of the Topic	No of Hours
1.	Introduction to pathology	1 hour
2.	Cell injury and cellular adaptation – Necrosis, Different types of necrosis.	1 hour
3.	Fluids and Haemodynamic derangements – Oedema, Pathogenesis of renal and cardiac oedema, Shock, Thrombosis	1 hour
4.	Inflammation and healing – Vascular changes, vascular permeability, cellular events- margination, chemotaxis, phagocytosis. Healing & Repair – Process of healing by primary intention & secondary intention, factors influencing wound healing.	2 hours
5.	Infectious and parasitic disorders: Tuberculosis, Leprosy, AIDS/HIV infection and pathogenesis	2 hours
6.	Neoplasia – Nomenclature, metaplasia, dysplasia, anaplasia, hyperplasia and hypertrophy. Benign and malignant tumour	2 hours
7.	Environmental and nutritional diseases	2 hours
8.	The blood vessels and lymphatics- atherosclerosis & aneurisms	1 hour
9.	The heart- MI and RHD	1 hour
10.	The lymphoid system	1 hour
11.	The respiratory system – Aetiology, types and clinical features of Emphysema, bronchitis, bronchiectasis, Asthma, Pneumonia	1 hour
12.	The gastrointestinal tract- Carcinoma of oesophagus, gastric and duodenal ulcers, viral hepatitis.	1 hour
13.	The liver , biliary tract and exocrine pancreas	1 hour
14.	The kidney and the lower urinary tract	1 hour
15.	The endocrine system – goiter, diabetes	1 hour
16.	The musculoskeletal system	1 hour
17.	The nervous system- meningitis, Encephalitis, CNS tumours	1hour
18.	Techniques for the study of pathology (3hr)	1 hour
19.	Diagnostic cytopathology	1 hour
20.	Hematology- disorders of the RBC, bleeding disorders, anemia, Iron-deficiency anemia, Vit B12 deficiency, sickle cell anemia, platelet disorders. Diseases of WBC- leukemia, lymphoma.	1 hour

Demonstration

1.	Demonstration of slides & laboratory visit	6 hours

Total Theory hours: 30

GENERAL AND APPLIED PHARMACOLOGY

PAPER-2

Topic No	Name of the Topic	No of Hours
1.	**Terminology:** Classification of drugs, principles of drug administration and routes of drug administration. Distribution, metabolism, excretion of drugs, factors influencing drug action factors modifying drug action, drug allergy and toxicity mechanism of drug action (Various ways in which they act)	2 hours
2.	**Autonomous nervous system:** Anatomy and functional organization, list of the drugs acting on ANS including dose, Route of administration, indications, contraindications, adverse effects.	1 hour
3.	**Cardiovascular drugs:** Enumerate the mode of action & Side effects and Therapeutic uses of the following drugs, antihypertensive, beta-adrenergic antagonists, alpha-adrenergic antagonists, peripheral vasodilators, calcium channel blockers, anti arrhythmic drugs, cardiac glycosides, sympathetic and non sympathetic inotropic agents, coronary vasodilators, anti anginal anti failure agents. Lipid lowering and anti atherosclerotic drugs. Drugs used in hemostasis. Anticoagulants, Thrombolytics Anti thrombolytics, drugs used in the treatment of shock	4 hours
4.	**Anaesthetic Drugs :** Definition of local and general anesthetics Classification of general anesthetics. Pharmacokinetics and pharmacogenetics of inhaled anaesthetic agents, Intravenous general anesthetic agents Local anesthetic- Classification, mechanism of action, duration of action, preparation, pulmonary effects of general anesthetic agents, local anesthetic agents. NMBs	4 hours
5.	**Analgesics:** Definition and classification, Routes of administration, Side effects, Management of non-opioid and opioid analgesics	2 hours
6.	**CNS stimulants & depressants:** Alcohol, Sedatives hypnotics and narcotics, CNS stimulants, Neuromuscular blocking agents and muscle relaxants, sedative hypnotics-barbiturates, benzodiazepines.	2 hours
7.	**Pharmacotherapy of Respiratory Disorders:** Modulators of bronchial smooth muscle tone & pulmonary vascular smooth muscle tone. Pharmacotherapy of Bronchial asthma Pharmacotherapy of cough, mucokinetic and mucolytic agents Pulmonary effects of general anesthetic agents, local anesthetic agents, Use of bland aerosols in respiratory care.	4 hours

8.	**Corticosteroids:** Classification, mechanism of ac fects and complications, preparation, ROA, classi thetic corticosteroids	
9.	**Antihistamines & antiemetics:** Classification & mechanism of action, adverse effects & preparations, routes of administration	1 hour
10.	**Diuretics:** Renal physiology, site of action of diuretics, adverse effects, preparation & dose, route of drug administration	1 hour
11.	**Chemotherapy of Infections**: Classification and mechanism of action of antimicrobial agents. Combination of anti microbial agents. Chemo prophylaxis, Classification & Spectrum of activity. ROA. Penicillin Cephalosporin's, Amino glycosides Tetracycline's, Chloramphenicol, Antitubercular drugs	1 hour
12.	**Miscellaneous:** IV fluids – various preparations and their usage Electrolyte supplements, immunosuppressive agents, new drugs included in respiratory care, new drugs used in metabolic and electrolyte imbalance.	3 hours
13.	**Drug toxicity & safety**	1 hour
14.	**Prescription and pharmaceutical calculations**	1 hour

Total Theory hours: 30

Demonstration

1.	Prescription of drugs of relevance	
2.	Experimental pharmacology directed to show the effects of commonly used drugs	
3.	Relevance and interpretation of few charts	
4.	Calculation of drug dosage	

APPLIED SCIENCE – 1

PAPER-34

Topic No	Name of the Topic	No of Hours
1.	**Patient contact techniques** Verbal & Non-verbal communication, Patient interview and examination, Conflict and conflict resolution	2 hours
2.	**Medical History Taking:** Social history, categories, common errors in history taking. Maternal and perinatal / neonatal history, medication history.	1 hour
3.	**Record keeping:** Legal aspects of record keeping, components of medical record, POMR, review data in patient record, respiratory care orders, and progress notes. Clinical laboratory data interpretation	2 hours
4.	**Physical examination of the patient:** Chest topography (identification of imaginary lines and topographical landmarks) & assessment of the chest. Sensorium, emotional state and ability to cooperate, level of pain.	1 hour
5.	**Examination of the respiratory and cardiovascular system.**	2 hours
6.	**Lung sounds** (including demonstration)	2 hour
7.	**Heart sounds** (including demonstration)	1 hour
8.	**Assessment of other body systems:** Abdominal organs, neurological status, skin and its extremities, temperature, digestive and renal system, reproductive system.	3 hours
9.	**Techniques of percussion & palpation**	1 hour
10.	**Nutritional status:** Types of diets, caloric needs	1 hour
11.	**Apgar score**. L/S ratio, gestational age	1 hour
12.	**RAMSAY** sedation scale, GCS	1 hour
13.	**Vital signs**	1 hour
14.	**Symptoms of respiratory disorders:** Cough & pharmacotherapy of cough Haemoptysis- causes and emergency management Dyspnea – types and causes Cyanosis- acute and chronic causes Nasal flaring and jaw breathing, paradoxical breathing Causes for the use of accessory muscles for respiration.	6 hours
15.	**Inspection of the chest**	1 hour
16.	**Symptoms of cardiovascular disease**	1 hour
17.	**Universal precautions**	1 hour
18.	**Bedside assessment of the patient**	1 hour
19.	**Principles of infection control:** Infection control strategies in the hospital setting. Importance of best infection control practices in Respiratory care	3 hours
20.	**Bronchial hygiene therapy (BHT)** Physiology of airway clearance, goals and indications	2 hours
21.	**Lung expansion therapy (LET)** Causes and types of atelectasis, clinical sign of atelectasis, Consolidation of lung	2 hours

22.	**Chest physical therapy (CPT)** Indications, ideal patient for therapy, preparing the patient for the procedure, techniques, classification of exercises, physiologic response to exercises, monitoring during the procedure	2 hours
23.	**Breathing exercises:** different deep breathing exercises, design a programme- intensity, frequency, duration and mode	1 hour
24.	**Postural drainage therapy**	1 hour
25.	**Airway clearance techniques:** suctioning, suction catheters	1 hour
26.	**Basic life support (BLS) adult**	2 hours
27.	**Basic life support (BLS) pediatric**	2 hours
28.	**Foreign body airway obstruction and management**	1 hour
29.	**Infant basic life support**	1 hour
30.	**Applied aspects of anatomy and physiology of lungs (Revision)**	2 hours

31.	Acute sinusitis	1 hour
32.	Acute pharyngytis	1 hour
33.	Laryngo tracheitis & Epiglotitis	1 hour
34.	Bronchitis & bronchiectasis	1 hour
35.	Pulmonary embolism	1 hour
36.	Lung cancer & Lung abscess	1 hour
37.	Pneumonia (community acquired)	1 hour
38.	Pneumonia (hospital acquired)	1 hour
39.	COPD	1 hour
40.	Immuno compromised host	1 hour
41.	Pneumothorax	1 hour
42.	Pleural diseases & pleural effusion	1 hour
43.	Pulmonary edema and management	1 hour
44.	ALI/ARDS/Severe acute respiratory distress syndrome (SARS)	1 hour
45.	Toxic inhalation & smoke inhalational injury	1 hour
46.	Acute respiratory failure	1 hour
47.	Viral and fungal lower respiratory tract infections	1 hour
48.	Upper respiratory tract infections	1 hour
49.	Occupational lung disease	1 hour
50.	Sleep disorders	1 hour
51.	Asthma	1 hour
52.	Eosinophilia	1 hour
53.	Pulmonary hypertension	1 hour
54.	Flail chest, diseases of the mediastinum and the chest wall	1 hour
55.	Dyspnea and management	1 hour
56.	Myasthenia gravis & Gullian barre syndrome	1 hour
57.	Snake bite, near drowning, poisoning, hanging,Tetanus poisoning, burn injury.	1 hour
58.	Restrictive lung disorders	2 hours
59.	Mechanics of breathing including compliance and resistance	1 hour
60.	Discussion on O2 & CO2 transport- Regulation of respiration	1 hour

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Demonstration & Practical

1.	Practicum on physical examination	2 hours
2.	Practicum on medical history taking and record keeping	2 hours
3.	Assessment of the patient with respiratory failure	2 hours
4.	Lung sounds and heart sounds Simulator based demonstration	4 hours
5.	Dyspnea- clinical presentation	2 hours
6.	Pneumothorax – diagnosis, management.	2 hours
7.	Pleural effusion- clinical presentation	2 hours
8.	Neuromuscular diseases- long term respiratory care	2 hours
9.	Measurement of O2 delivery, oxygenation	2 hours
10.	BLS Demonstration with manikin	3 hours

Total Theory hours: 80

Total Practical hours: 20

Attention: Demonstration & Practical

- Practical classes will be taken during the clinical postings.
- It is compulsory to attend rotational postings in different clinical areas after the routine theory classes.

ANTIMICROBIAL RESISTANCE

Objectives

- To educate them on the need for containment of AMR
- Develop skills to understand their responsibility to combat AMR through judicious handling of antimicrobials and infection control practices.

Lecture No.	Topics	Number of hours
1,	Antimicrobials chemotherapy: Classification of antimicrobials by mechanism of action, pharmacokinetics and pharmacodynamics, spectrum of activity, therapeutic and prophylactic use, adverse reactions. Cell wall acting agents, polymyxins, protein synthesis inhibitors, quinolones, sulfonamides. Overview of antifungal, antiviral and antiprotozoal drugs.	5 hours
2	Antimicrobial resistance – Mechanisms in brief. AMR burden in the global and national level, Surveillance strategies, Existing AMR surveillance systems. Multidrug resistant nosocomial pathogens: MRSA, VRE, ESBL-producers, Carbapenemase producers. Transmission of antimicrobial resistance in the nosocomial setting.	1 hour
3	Overview of antimicrobial susceptibility testing: Disc diffusion tests, Etests, broth macrodilution and microdilution. Minimum inhibitory concentration, mimimum bactericidal concentration. Automated methods of susceptibility testing. Molecular tests: PCR. Gene Sequencing.	1 hour

4	Introduction to Antimicrobial stewardship. Different models of antimicrobial stewardship Need for ASP, definition, strategies: front-end strategy. Preauthorization, formulary restriction. Back-end strategy. Prospective audit and feedback. Right drug, dose, route, duration, de-escalation, source control. Importance of appropriate sample collection. Rapid diagnostics.	1 hour
5	Hospital infection control. Hand hygiene practices, 5 moments for hand hygiene, standard precautions, transmission-based precautions, and Personal protective equipment, Vaccines for healthcare workers, Needle stick injuries, and environmental disinfection.	2 hours
6	Situation analysis of AMR – focus on India Global and national action plans and strategies Existing reports on the role of public health in addressing AMR – problem identification and issue recognition, policy formulation, decision making , policy implementation. PESTEL aspects of AMR	1 hour (for public health)

Recommended Books (Reference Books/Text Books):

1. Manual of Infection Prevention and control – NizamDamani
2. Antimicrobial Drug Resistance Douglas L Mayer
3. ApurbaSastry&Deepashree's Essentials of Hospital Infection Control
4. Harrison's Principles of Internal Medicine
5. Katzung Basic and Clinical Pharmacology 14th Edition

Other readings & relevant websites:

1. IDSA guidelines
2. www.uptodate.com
3. Journal of Hospital Infection
4. American Journal of Infection Control

(https://www.ncbi.nlm.nih.gov/books/NBK536193/)

APPLIED SCIENCE -2

Paper – 4

Topic No	Name of the Topic	No of Hours
1.	**Gas Physics:** States of matter and gas laws, change of state, Gas behavior under changing conditions, Pressure measurement, Gas flows and diffusion, Gas laws, Miscellaneous concepts such as Density and Specific Gravity	2 hours
2.	**Gas analyzers**	1 hour
3.	**Medical gas supply & storage:** Compressed gas cylinders, Colour coding, Cylinders and cylinder valves, Cylinder storage, Diameter index safety system, Medical gas pipeline system, Air compressors, Oxygen concentrators, properties of He and NO, Alarms, Safety devices, portable liquid oxygen systems	2 hours
4.	**Gas administration devices**: Reducing valves, flow meters and regulation of gas pressure and flow, central piping system, selection of device to regulate pressure or flow.	1 hour
5.	**Medical gas therapy:** Oxygen therapy- goals, clinical practice guidelines, hazards and precautions, O2 delivery systems, protocol based O2 therapy approach. Hyperbaric oxygen therapy, Oxygen toxicity. Nitric oxygen therapy, helium oxygen therapy.	4 hours
6.	**Humidity therapy:** Physiologic control of heat and moisture exchange, Indications for humidification. Humidity producing equipment, types and methods to achieve proper conditioning of gas.	2 hours
7.	**Bland aerosol therapy:** Aerosol generators, airway appliances for bland aerosol administration.	1 hour
8.	**Aerosol drug therapy:** Aerosol generators, Factors influencing aerosol deposition in the lungs, Particle deposition, Assessment based aerosol therapy protocols, Infection control.	2 hours
9.	**Nebulizers, Metered dose inhalers and DPI's.**	1 hour
10.	**Artificial airways Part- 1** Oro-nasopharyngeal airways, Nasal airways, LMA, Combitubes	1 hour
11.	**Artificial airways Part- 2** Oral, nasal endotracheal tubes, tracheostomy tubes, special purposed tubes	1 hour
12.	**Care of the artificial airway:** Long term management, infection control practices, suctioning, cuff management	2 hours
13.	**Endotracheal Intubation:** Preparing the patient for endotracheal intubation, positioning the patient, awake intubation	1 hour
14.	**Difficult airway management**	2 hours
15.	**Manual Resuscitators & breathing circuit**	1 hour

16.	**Infection Control:** Universal precautions, hand washing, isolation procedures, assure cleanliness of the equipments by selecting or determining appropriate, agent and technique for disinfections or sterilization and monitoring, assure proper handling of biohazardous materials, incorporated ventilator associated pneumonia prevention, protocol, implementing infectious disease protocol eg.SARS, transmission - prevention	4 hours

Diagnostic Techniques:

17.	**Electrical conduction system of the heart**	1 hour
18.	**The normal ECG & standardization of conventional lead positions of 12 lead ECG**	1 hour
19.	**Cardiac arrhythmias:** Sinus arrhythmia, sinus bradycardia, sinus tachycardia, atrial flutter and atrial fibrillation.	1 hour
20.	**Cardiac arrhythmias:** Premature atrial contractions, junctional rhythms, ventricular arrhythmias, MI, ventricular fibrillation	1 hour
21.	**Factors affecting cardiac output-** Preload, after load, myocardial contractility, SVR	1 hour
22.	**Central venous catheterization:** Routes, techniques and uses. Interpretation of data obtained from central venous catheter	1 hour
23.	**Pulmonary artery catheterization:** Techniques and interpretation of data obtained	1 hour
24.	**Arterial line insertion & ABP monitoring:** Anatomical locations for insertion, Sampling and procedure of insertion	2 hours
25.	**Bedside assessment of pulmonary function:** Spirometry, V-T studies, V-F studies, P-V studies.	1 hour
26.	**Imaging studies:** Values and limitations of chest X-ray Conventional and special radiological views, Chest X-Ray Interpretation. Review of clinical findings and history. Preparation of viewing film. Normal anatomy on chest x-ray. Technical evaluation of chest x-ray. Method of chest x-ray evaluation.	4 hours
27.	**Introduction to Pulmonary Diseases and Chest Radiographs** Atelectasis, Pneumothorax, Pneumonia, Pulmonary tuberculosis, Occupational lung diseases, Pulmonary edema, COPD, Restrictive lung diseases etc.	2 hours
28.	**Blood gas analysis: Interpretation of ABG reports-** Status of oxygenation, ventilation, and acid base status. Interpretation of venous blood samples	3 hours
29.	**Introduction to PFT lab:** Spirometry & history of spirometer, instrumentation, calibration and quality control, infection control, dead space, terms and symbols, volume at ATPS and BTPS.	4 hours
30.	**Pulmonary function studies:** Spirogram, normal volumes and capacities, lung volume measurement, flow rate measurement, flow volume measurement, closing volume measurement, gas distribution measurement, exercise testing, bronchodilator effectiveness measurement.	4 hours
31.	**Interpretation of PFT data**	2 hours

Mechanical Ventilation

32.	**History of mechanical ventilation**	1 hour
33.	**Negative pressure ventilation**	
34.	**Physical principles of mechanical ventilation:** Spontaneous vs positive pressure ventilation Positive vs negative pressure ventilation Power control and systems, Drive mechanisms, variables Pressure generators, flow generators, air oxygen blending systems, delivery circuits.	4 hours
35.	**Physiological effects of PPV:** Pressure & pressure gradients, effect of MV on different parameters, Minimizing the adverse effects of MV on multiple systems, Complications	2 hours
36.	**Respiratory failure and need for mechanical ventilation** Physiological measurements of ARF, Type 1 and type 2 RF, Chronic respiratory failure. Assessment of respiratory fatigue, weakness & work of breathing.	3 hours
37.	**Indication and assessment of the need for artificial ventilation**	1 hour
38.	**Initiating and adjusting ventilator settings** Initial ventilator settings, adjusting ventilator, oxygenation	2 hours
39.	**Selecting a ventilator and the mode:** Full and partial ventilator support, mode of ventilation and breath delivery, type of breath delivery, targeting the control variables, Closed loop ventilation strategy, interfacing b/w spontaneous and PPV.	4 hours
40.	**Heart lung interactions of during MV**	1 hour
41.	**Monitoring in Mechanical Ventilation:** Initial assessment of patient on MV, documentation, airway pressures, vital signs, examination of the chest, management of the airway, compliance and resistance	2 hours
42.	**Non-invasive assessment of respiratory function:** Non-invasive measurement of blood gases, indirect calorimetry and metabolic measurements, assessment of respiratory mechanics, hemodynamic monitoring	2 hours

Demonstration & Practical:

1.	Practicum on assessment of CVS/ vital signs/insertion of invasive lines, sampling maintenance of lines	3 hours
2.	Practicum on clinical laboratory data interpretation/blood gas	2 hours
3.	Practicum and simulations in CPT	2 hours
4.	Practicum and clinical demonstration of suctioning and other airway clearance techniques.	2 hours
5.	Practicum and clinical demonstration of deep breathing exercises	2 hours
6.	Clinical demonstration of BLS (Manikin)	4 hours
7.	Demonstration on O2 delivery devices, oxygen therapy	2 hours

8.	Demonstration – storage of medical gases	2 hours
9.	Clinical postings in gas plant/ demo of colour codings, supply unit	2 hours
10.	Demonstration of regulators and flow meters	2 hours
11.	Demonstration of various humidification systems	2 hours
12.	Demonstration of different aerosol delivery devices Nebulizers, p-MDIs, DPIs, Mesh nebulizers, Ultrasonic nebulizers	2 hours
13.	Transcutaneous monitoring, pulse oxymeter, capnography	2 hours
14.	Demonstration of manual resuscitators & breathing circuits	2 hours
15.	Demonstration of Mechanical ventilators and its internal circuitry	4 hours
16.	Clinical demonstration of effects of PPV on different organs	
17.	Practicum and case discussion on criteria for tracheal intubation and initiation of ventilator support	4 hours
18.	Different postural drainage techniques & airway clearance tech.	2 hours
19.	Demonstration of artificial airways/ airway management technique	4 hours
20.	Demonstration of monitoring of patient on MV	3 hours
21.	Maintenance, cleaning, sterilization of respiratory equipments	2 hours

Total Theory hours: 80

Total Practical hours: 50

Clinical Postings:

Intensive care units
Post operative intensive care units
High dependency intensive care units
Outpatient departments
Laboratories

THIRD YEAR

BASIC SCIENCE

Paper- 1

Part- 1

Topic No	Name of the Topic	No of Hours
1.	**Medical Ethics &the Relevant Medico-legal Aspects** Responsibilities and duties, Ethical behavior &conduct, Medico-legal Aspects its relation to consumer Protection act, Basics of computer application.	3 hours
2.	**Ethical and legal implications of practice in Respiratory Care**	2 hours
3.	**Basics of computer application:** MS-windows, MS-word, MS excel, MS-Power point, Data Processing	1 hour
4.	**Basics of Medical Statistics:** Common statistical terms, Sources and representation of data, Measures of location, Average and percentiles, Measures of central tendency and dispersion, Normal distribution and normal curve, Sampling and probability, Sampling variability and its significance, Significance of difference in mean, Chi-Square test, Designing and methodology of an experiment of a study, Representation of data as tables and graphs, Demography of vital statistics, Standard deviation, P Value and its significance, Recording of data and maintenance of records.	4 hours
5.	**Role of statistics in Health science:** Introduction to research methodology, health information system, Rate, ratio, incidence, proposition, prevalence, hospital statistics, hypothesis, reliability and validity, correlation.	4 hours
6.	**Format of Scientific Documents:** Structure of research protocol, structure of thesis/research report, formats of reporting in scientific journals, systemic review of meta analysis	1 hours
7.	**Epidemiology**	1 hours
8.	**Biomedical Waste And its Management**	1 hours
9.	**Electricity and Electro Medical Equipments and Safe Guards:** Basics of Electricity, Functioning of electro medical equipments earthing, Care of apparatus, Static electricity.	2 hours
10.	**Intensive care unit and its structure**	1 hour

Total Theory hours: 20

Part 2

Cardiopulmonary Intensive Care Management

1.	**Shock:** Hypovolaemic shock, cardiogenic shock, septic shock, ionotropes, vasopressors and diuretics in shock.	2 hours
2.	**Acute and chronic renal failure**	
3.	**Intercostal drainage tubes:** Technique of placement, complications, underwater seal systems and its management.	2 hours
4.	**Chest trauma:** Management of RTA in ICU	1 hour
5.	**ACLS:** CPR, advanced airway management techniques, diagnosis and management of life threatening arrhythmias, ventilation and electrolyte balance during resuscitation, drugs used in resuscitation, Post resuscitation support	5 hours
6.	**Major adult cardiac disorders** Concepts in ventilator management, ICU respiratory care Post operative respiratory care of post cardiac surgical patients.	2 hours
7.	**Major pediatric cardiac disorders** Concepts in ventilator management, ICU respiratory care Post operative respiratory care of post cardiac surgical patients.	4 hours
8.	**General pediatric disorders who requires ventilator support** Concepts in ventilator management, ICU respiratory care Post operative respiratory care of post cardiac surgical patients	1 hour
9.	**Neurological disorders** Concepts in ventilator management, ICU respiratory care Post operative respiratory care of post cardiac surgical patients.	1 hours
10.	**MV in Congestive heart failure**	1 hour
11.	**Stroke**	1 hour
12.	**Renal failure & Haemodialysis**	1 hour
13.	**Respiratory defense mechanisms**	1 hour
14.	**Prone ventilation**	3 hours
15.	**Liquid ventilation & ECMO**	1 hours
16.	**Bronchoscopy Part 1**	2 hours
17.	**Sedation and paralysis in Mechanically ventilated patients**	1 hours
18.	**Ventilator associated pneumonia**	1 hours

Total Theory hours: 30

1.	**Two hours practical & clinical demonstration for each topic**	36 hours

Part 3

Neonatal Respiratory Care

1.	**Neonatal cardiorespiratory anatomy and physiology**	2 hours
2.	**Thermoregulation in the newborn**	2 hours
3.	**Foetal circulation**	2 hours
4.	**Neonatal respiratory disorders**	2 hours
5.	**Assessment of adequacy of oxygenation and ventilation**	2 hours
6.	**Oxygen therapy in neonates**	2 hours
7.	**CPAP & advanced technologies**	2 hours
8.	**Initiation of mechanical ventilation in neonates & airway management**	4 hours
9.	**HFOV & HFV in neonates** Initiation criteria, Monitoring assessment and adjustment, how to return to conventional ventilation	3 hours
10.	**Weaning and extubation**	2 hours
11.	**Surfactant replacement therapy**	1 hour
12.	**Hyaline membrane disease, RDS**	2 hours
13.	**Periodic breathing and apnea in neonates**	1 hour
14.	**Bronchopulmonary dysplasia, transient tachypnea of the new-born**	1 hour
15.	**Neonatal Resuscitation**	2 hours

Total Theory hours: 30

1.	**Two hours practicum for each topic.**	30 hours

Attention:
Overall theory hours for Basic Science paper-1 is 80
Overall practical and demonstration hours for Basic Science paper-1 is 66

APPLIED SCIENCE
PAPER - 2

Topic No	Name of the Topic	No of Hours
1.	**Monitoring in mechanical ventilation**: Concepts of monitoring, vital Signs, capnography, pulse oxymetry, chest inspection and auscultation, airway pressures etc, fluid electrolyte analysis, Blood gases drawing and interpretation, Transcutaneous blood gas monitoring, methodology assessment and limitations, biomedical engineering aspects.	2 hours
2.	**Hemodynamic monitoring:** Arterial line insertion, central venous pressure CVP, pulmonary artery catheter and PCWP, cardiac output and vascular resistance including calculation, preload after load and contractility assessment, interpretation of mixed venous saturation.	2 hours
3.	**Modes of ventilation**: conventional modes, dual control modes, APRV, NAVA, Bi Level	2 hours
4.	**Positive end expiratory pressure (PEEP) therapy.**	2 hours
5.	**Ventilator Graphics:** volume ventilation with constant flow, pressure ventilation, PSV, P-V loops, F-V loops. Analyzing the ventilation strategy using waveforms	3 hours
6.	**Managing ventilator patient:** Strategies to improve ventilation, improve oxygenation, acid base electrolyte balance, fluid electrolyte nutrition balance and management, trouble shooting of ventilator alarms and events	2 hours
7.	**Protective lung ventilation strategies**	2 hours
8.	**Lung recruitment strategies**	2 hours
9.	**Pathophysiology and management**	2 hours
10.	**Disease specific applications of mechanical ventilation**	4 hours
11.	**Independent lung ventilation**	1 hour
12.	**Percutaneous dilatational tracheostomy**	3 hours
13.	Care of the accessories: Care of ventilator circuit, Care of artificial airway, humidification, strategies for preventing infection	1 hour
14.	Pharmacotherapy for mechanical ventilation: Drugs for improving ventilation, steroids, NMBs, sedation, anxiolitics, narcotics	1 hour
15.	Aerosol therapy for a mechanically ventilated patient	1 hour
16.	Weaning of mechanical ventilation: Techniques, evidence based practices in weaning, recommendations, factors for weaning failure, pharmacotherapy during weaning, SBT trials, RSBI, tracheostomy weaning, long term, communication.	3 hours
17.	Withholding and withdrawing ventilator support.	1 hour
18.	Trouble shooting the ventilator	1 hour
19.	Alarms and limits	1 hour
20.	Assessment of outcome of mechanical ventilation	1 hour
21.	Transport of a mechanically ventilated(in hospital & intra hospital)	2 hours

	Principles of blood gas analysis	
22.	Basic physical and physiological principles	2 hours
23.	Hydrogen ion regulation in body fluids	1 hour
24.	Oxygen & transport in the blood, oxygen content measurement	1 hour
25.	Acid base balance, Clinical approach to acid base problems, acid excretion, acid base disturbances	2 hours
26.	Quality control in sampling, calibration	1 hour
27.	Correction factors in blood gas	1 hour
28.	Measurement of Hemoglobin and saturation	1 hour

	Non-invasive Ventilation	
29.	Equipments for NIV, ventilators, interfaces, accessories	1 hour
30.	Modes of non invasive support	1 hour
31.	Fine tuning of the patient on NIV & synchronization	1 hour
32.	Quality control practices in NIV	1 hour
33.	Pediatric NIV- CPAP, Bubble CPAP etc	1 hour
34.	Disease specific application of non invasive ventilation: COPD, Asthma, OHA, acute respiratory failure, as a weaning tool, CHF, ILD, NMD and quadriplegia.	2 hours
35.	NIV in ICU and HDU, Critical care ventilator vs c NIV machines.	Total Theory hours: 60
36.	Care of the patient on NIV- humidification, preventing pressure sores, airway clearance, physiotherapy, weaning from NIV.	1 hour
37.	Home ventilation- Invasive and non-invasive methods	1 hour
38.	Assessment of the home care patient & patient selection criteria	1 hour
39.	Monitoring and complications of NIV	1 hour
40.	Ethical and medico legal aspects of assisted ventilation	1 hour

Attention:
One hour practical/demonstration/discussion will be there for all the above topics in applied paper 2 – **40 hours**

PULMONARY REHABILITATION

Paper-3

Topic No	Name of the Topic	No of Hours
1.	Historical perspective of pulmonary rehabilitation	1 hour
2.	Basic concepts of pulmonary rehabilitation	1 hour
3.	PR – definition and characteristics	1 hour
4.	Selection and assessment of chronic respiratory disease patients	2 hours
5.	Therapeutic interventions in PR: Ventilatory muscle training, Nutritional assessment, Preventive aspects for the patient with chronic lung disease, exercise in the rehabilitation of patients with respiratory disease.	2 hours
6.	Tobacco dependence- pathophysiology and management, tobacco cessation program learning objectives.	2 hours
7.	Sleep disorders in pulmonary patients.	2 hours
8.	Educating the patient and family in health management	1 hour
9.	Rehabilitation in the pediatric patients with pulmonary disease.	1 hour
10.	Rehabilitation in non - COPD lung disease	1 hour
11.	Rehabilitation for long term Tracheostomised patient.	1 hour

12.	Bronchoscopy, BAL- Part 2	4 hours
13.	Thoracoscopy	2 hours
14.	Assessment of the patient with respiratory disorder and interpretation of pulmonary function studies	2 hours
15.	Pre-operative pulmonary function studies/ bedside assessments	2 hours
16.	Spirometry- Interpretation of lung volumes	2 hours
17.	Measurement of D_{LCO}	2 hours
18.	Spirometry and body plethysmography.	2 hours
19.	Setting sleep lab	2 hours
20.	Technological advances in the sleep study and its management	2 hours

Total Theory hours: 60

Attention:
One hour practical/demonstration/discussion will be there for all the above topics in pulmonary rehabilitation – **20 hours**

PROJECT WORK, ACADEMIC PRESENTATIONS AND STUDENT EVALUATION

Project Work: 50 marks

To ensure the theoretical knowledge gain goes on concurrently with the gain of practical skills, a project work is included during the third year and internship. The respiratory therapy student/intern should submit two project works

1. One month before appearing for the final year examination.
2. Before completing six months of internship at AIMS
   (No weightage of marks for project 2)

Note: The project study topic will be given to the student in the first month of third year and first month of internship.

Academic Presentations: 30 marks

The respiratory therapy student should present atleast two academic presentations in a month on topics related to respiratory therapy before appearing for the final year examination, and minimum one presentation in month during the internship period.

The topics will be given to the student from the respiratory therapy department.

Student Evaluation: 20 marks

The student will be strictly evaluated everyday during their postings and clinical works till he/she finishes the course. Evaluation done on the basis of the performance of the student/intern during his/her clinical duties in different clinical postings at AIMS.

BACHELOR OF SCIENCE IN RESPIRATORY THERAPY (BSc RT)
Fourth Year – Internship Programme

Description:

One-year compulsory internship in various intensive care units, outpatient departments, research unit under Amrita Institute of Medical Sciences during which the students get to hone the skills and knowledge acquired in the three years of rigorous study. During this period their work is very similar to what is expected of them after the completion of their training. This year ensures their readiness to approach a patient in any setting.
The one-year compulsory internship includes postings at Surgical and medical intensive care units, Pulmonary medicine, Neuro medicine & surgery, Emergency medicine, Neonatology, Operation theaters and rehabilitation centre.

Eligibility:

Candidate who has successfully completed his/her theory and practicals in first three years of Respiratory Therapy programme.

Duration:

One year (compulsory Internship) at Amrita Institute of Medical Sciences.

Reference:

Fundamentals of respiratory care
Egan's – Craig L. Scanlon

Basic Papers:

Gray's Anatomy
Williams P.L, Warwick R., Dyson M, Bannister LH

Human Anatomy- Regional and Applied Volume
B.D Chaurasia

Text Book Of Medical Physiology
Arthur C. Guyton, John E Hall

Essentials of Medical Physiology
Anil Baran Singha Mahapatra

Clinical Anatomy For Medical Students
Richard S.Snell

Basic Pathology: An introduction to the mechanisms of disease
Sunil R Lakhani, Susan A Dilly,Caroline J Filayson

Appleton & Langes Review of Microbiology and Immunology
Dr.William W . Yptis, Tadayo Hashimoto

Medical Microbiology
Michael A.P Faller, Patrick R Murray

Medicine Preparation Manual
George Mathew , K.B.I. Churchil

Principles Of Internal Medicine
Jean D.Wilson, Eugene Braunwald, Kurt J

Principles of Internal Medicine
Harrison's

A Text Book Of Cardiovascular Medicine
Braunwald (edr)

For mechanical ventilation:
David Chang
Susan Pilbeum
Mc -Taire
Tobin

Critical care:
Pe.Oh –critical care medicine
Farokh Udwadia –intensive care
Irwine Rippe –intensive care principles and procedures
Paul Marino –the ICU
Text Book Of Critical Care ,Shoemaker , Ayres , Grenvick , Holbrook

Respiratory physiology:
Text Book Of Respiratory Medicine
John F Murray, jay a nadel
John.B.West
J.F.Nun

Respiratory therapy equipments:

Respiratory Care Equipment
Steven P McPherson
Dorsh n Dorsh

Neonatal respiratory care:

Textbook of neonatology
Thoharti –Avery –
Meherban singh –care of newborn
Claire

Pulmonary rehabilitation

Hodgkin's
Robert wilkins
Principles and practices of cardiopulmonary Physiotherapy
Physical therapy – Donna Frownfelter & Elizabeth Dean
Essentials of cardiopulmonary physical therapy
Steven Sadowsky.H Hellen .A. Hillegas
Physical Rehabilitation Assessment and Treatment
Susan O. Sullivan , Thomas J
Practical Pulmonary Rehabilitation
Morgan and Sing

Anatomy

Text Book of Anatomy
B.D.Gosh
General Anatomy
B.D.Chaurasia
Rose & Willson Appied Anatomy and Physiology
Histology
G.P.Pal

Psychology

Introduction to Psychology
Munn
Understanding Psychology
Feldman R.G
Introduction to Psychology
Morgan C.T, King.B.A
Essentials of Psychology
Bhatia.M.S
Psychology
Baron.R.A
Text Book of Psychology for Health Professionals
Viswambaran R

Community Medicine

Park's Text Book of Preventive and Social Medicine
K.Park
Review in Community Medicine
VVR.Seshu Babu

Microbiology

Text Book of Medical Paracytology

C.K.Jayaram Panicker

Text Book of Microbiology

Anand Narayan

Medical Microbiology

Roifit

Pharmacology

Essentials of Medical Pharmacology

Tripathi

Pharmacology and Pharmacotherapeutics

Satoskar

Pharmacological Basis Of Therapeutics

Goodman Gillman

Basics and Clinical Pharmacology

Katzung

Lippincotts - Illustrated Reviews of Pharmacology

Biochemistry

The Text Book of Biochemistry

Dr.D.M.Vasudevan , Sreekumari.S

Text Book of Biochemistry

T.N.Pattabhiraman

Essentials of Biochemistry

U.Sathyanarayanan

PATTERN OF QUESTION PAPERS

The duration of each theory paper will be three hours; the paper will have only one section of 70 marks.

Pattern of Question Paper

Structured Essay (2 out of 3)	- 30 marks (2 x 15 marks)
Short Notes (5 out of 6)	- 25 marks (5 x 5 marks)
Short answer question (5 out of 7)	- 15 marks (5 x 3 marks)

Total Marks	- 70 marks

SCHEME OF EXAMINATION

B.Sc Respiratory Therapy Degree Examination

Distribution of Marks for each subject

Paper Code	Subject Name	Theory				Aggregate
		University	Internal	Oral	Subject Total	
FIRST YEAR						
I	Anatomy	70	10	20	100	1400
II	Physiology	70	10	20	100	
III	Biochemistry	70	10	20	100	
IV	Microbiology	70	10	20	100	
V	Community Medicine	70	10	20	100	
VI	Clinical Psychology	70	10	20	100	
SECOND YEAR						
VII	Applied Pathology	70	10	20	100	
VIII	General and Applied Pharmacology	70	10	20	100	
IX	Applied Science I	70	10	20	100	
X	Applied Science II	70	10	20	100	
THIRD YEAR						
XI	Basic Sciences	70	10	20	100	
XII	Applied Science III	70	10	20	100	
XII	Pulmonary Rehabilitation	70	10	20	100	
XIII	Project +Viva	-	-	-	100	

IMPORTANT TELEPHONE NUMBERS

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