REGULATIONS AND CURRICULUM GOVERNING

M.Sc. RESPIRATORY THERAPY PROGRAM

Implemented in Academic Year 2021-22

Name of the Constituent Unit: Yenepoya School of Allied Health Sciences

RABBI ZIDNI 'ILMA

YENEPOYA

(DEEMED TO BE UNIVERSITY)

Deralakatte, Mangalore, Karnataka.

YENEPOYA
(DEEMED TO BE UNIVERSITY)

NOTIFICATION FROM THE UNIVERSITY

Sl. No.	ACM with date	Decisions/Approvals
1.	44th ACM/ 05.10.2021	Proposal for starting of M.Sc. in Respiratory Therapy under the Faculty of Allied & Healthcare Professions with an annual intake of 05 from the academic year 2021-22.
2.	47th ACM/ 20.06.2022	Starting of Postgraduates programme under the Yenepoya School of Allied Health Sciences – It should be in line with recommendations by Ministry of Health and Family Welfare Allied Health Section 2015-2016
3.	51st ACM/ 16.05.2023	Revision in the CBCS regulations governing PG program: Approval of CBCS regulations: Form CIA 40% and SEE 60% to CIA 50% and SEE 50%. Minimum pass marks for CIA shall be 50% and SEE shall be 50%
4.	58th ACM/ 13.08.2024	Approved the amendment of the dissertation credit distribution from 6 credits to 12 credits.
5.	63rd ACM / 13.05.2025	All the Postgraduates programme to follow the Continuous Internal Assessment (CIA) components of PG Dissertation to implement from the academic year 2024-25.

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1. Preamble

Health care sector has become one of the largest employment generation sectors in India and abroad. Rapidly changing and expanding horizon of the health care sector demands formal training programs in all its Allied areas. Postgraduate Program in Allied Health sciences specialty often encompasses a wide range of disciplines.one such highly demanded specialty is Respiratory therapy. This specialty concerned with the performance of diagnostic cardiopulmonary evaluation and respiratory therapy treatment applied to patients with deficiencies and abnormalities of the cardiopulmonary system. Respiratory therapists are involved in the care of those with acute and chronic respiratory problems in hospitals and hospital-related organizations.

The postgraduation in Respiratory Therapy will prepare the candidate for a career as an educator, researcher, or Therapist. Students may find a variety of options upon completion of post-graduation such as clinical instructor for Pulmonary Function Testing Laboratories, Pulmonary Rehabilitation Centre, Sleep Lab, Smoking Cessation Clinics, Asthma and Allergy Clinic, Clinical application specialist. Academic and Research pursuit are other areas that offer opportunities for professional growth and development. The Scope of growth in the field is tremendous with the improving healthcare system with an increase in Intensive Care Facilities. To meet the demand and to match our education system with the international educational pattern all the postgraduate programs are with Choice Based Credit System.

2. Definitions

2.1 Academic Year:

Two consecutive (one odd + one even) semesters constitute one academic year.

2.2 Choice Based Credit System:

The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).

2.3 Course:

Usually referred to, as “papers” is a component of a programme. The courses shall define learning objectives and learning outcomes. A course shall comprise lectures/ tutorials/ laboratory work/ field

work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.

2.4 Credits:

Credit defines the quantum of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Thus, normally in each of the courses, credits will be assigned on the basis of the number of lectures/tutorial laboratory work and other forms of learning required, to complete the course contents in a 16–20-week schedule: One credit =1 hour of lecture per week/ two hours of Laboratory or practical/three hours of clinical rotation, field work/posting. All courses need not carry the same credits.

2.5 Programme:

An educational program leading to award of a degree, diploma or certificate.

2.6 Grade Point:

It is a numerical weight allotted to each letter grade on a 10-point scale.

2.7 Credit Point:

It is the product of grade point and number of credits for a course.

2.8 Cumulative Grade Point Average (CGPA):

It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

2.9 Letter Grade:

It is an index of the performance of students in a said course. Grades are denoted by letters: O, A+, A, B+, B, C, P, F, AB.

2.10 Semester Grade Point Average (SGPA):

It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

2.11 Transcript or Grade Card or Certificate:

Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester.

Type of Courses

2.12 Core Course (CC): A course that should compulsorily be studied by a candidate as a core requirement is termed as a Core course. This is the core requirement to complete the M.Sc. Respiratory Therapy programme.

2.13 Skill Enhancement Course (SEC): These courses are aimed at improving practical, professional & procedural knowledge requirement for carrying the highly skilled task related to the field of study.

2.14 Multidisciplinary Electives (ME): Generally, a course which can be chosen from a pool of courses, and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline or subject or domain or nurtures the candidate's proficiency skill.

i. A candidate shall have the freedom to choose Multidisciplinary Elective courses during the academic duration of the particular PG program offered by the Yenepoya (Deemed to be University) through the PG Departments or SWAYAM / MOOC external online platforms or a mix of courses offered by Yenepoya (Deemed to be University) and SWAYAM/MOOC as appropriate.

ii. A candidate opting for SWAYAM/MOOC courses shall have the freedom to choose the courses of one's own choice and complete such courses before appearing 4th Semester end examination.

iii. A candidate shall compulsorily submit the pass certificate of each course successfully completed to the Controller of Examinations (COE) of Yenepoya (Deemed to be University) through the proper channel before appearing the 4th semester end examination.

iv. A candidate opting Multidisciplinary Elective Courses offered by the Yenepoya (Deemed to be University) through the PG Departments need to take up these courses generally during SECOND Semester and THIRD Semester of the Program.

v. A candidate shall not take the courses offered by the department in which she/he is enrolled.

vi. Registration for the Multidisciplinary Elective courses offered by the Yenepoya (Deemed to be University) shall be at least one week prior to the commencement of the course with the CBCS Co-ordinator. The CBCS Unit shall notify the list of courses after being approved by the respective BOS. For SWAYAM/MOOC courses shall be as per the enrolment notification by the respective implementation authorities.

Yenepoya (Deemed to be University) shall adapt the regulations of UGC governing SWAYAM/MOOC courses as amended from time to time.

3. Eligibility for Admissions:

The students who have passed with minimum of 50 % in B.Sc. RCT/RT or B.Sc. Critical Care Therapy from institutions where mode of study is a full-time program with internship in universities considered equivalent by Yenepoya (Deemed to be) University are eligible for M.Sc. Respiratory Therapy program. Candidates completing B.Sc. RCT/RT or B.Sc. Critical Care Therapy through correspondence course shall not be eligible. The candidate shall have obtained minimum of 50% aggregate of marks in all the years of university examination of degree course.

In case of SC/ST/OBC candidates the minimum marks shall be 45%.

4. Duration of the Program

The duration of the programme shall extend over 4 semesters (two academic years) of 15 weeks or more each with a minimum of 90 actual working days of instruction in each semester and 2 to 3 weeks of examinations. The successful completion will lead to Master's Degree in Respiratory Therapy.

An academic year shall consist of two semesters –

Odd Semester 1st& 3rd	September/October to February/March
Even semester 2nd& 4th	March/April to August/September

5. Maximum Period for Completion of Programme:

A candidate shall complete the four semesters (two years) program within four years from the date of admission.

6. Aim of the Program

To develop advanced respiratory therapy professionals with expertise in mechanical ventilation, critical care, and cardiopulmonary diagnostics, supported by strong educational and research competencies, who can deliver evidence-based therapeutic interventions, lead and innovate in intensive and rehabilitative care, contribute to medical device integration, and advance professional standards in respiratory therapy through scholarly practice, clinical leadership, and evidence-informed innovation in healthcare.

7. Outcomes of the Program

Program Outcome (PO):

PO1: Diagnose lung and breathing disorders, recommending evidence-based treatment approaches. (K, S)

PO2: Work collaboratively with doctors, nurses, physiotherapists, and other therapists in Intensive Care Units and rehabilitation settings to provide integrated patient care. (S, A, C)

PO3: Conduct patient interviews and perform chest examinations to assess and determine the best therapy for individual conditions. (K, S, C)

PO4: Consult with physicians and recommend therapy adjustments based on patient evaluations and clinical findings. (K, S, A, C)

Expected skill to be acquired by the end of the programme:

PO5: Educate patients and families on lung diseases to enhance their understanding and promote recovery. (K, S, A, C)

PO6: Provide guidance and support to medical device manufacturers, especially on respiratory therapy devices. (K, S, A, C)

PO7: Serve as educators in asthma clinics, pediatric clinics, and sleep clinics, specializing in asthma and sleep-disorder diagnostics. (K, S, A, C)

PO8: Conduct research that contributes to evidence-based practice, enhancing and evolving current respiratory care techniques. (K, S, A)

PO9: Develop and demonstrate high professional competence and commitment to advancing best practices in respiratory care. (K, S, A)

PO10: Analyze and interpret arterial blood gases, manage ventilators, and oversee artificial airway devices for patients with compromised breathing. (K, S)

PO11: Administer various respiratory treatments, including chest physiotherapy, postural drainage, secretion clearance, and aerosol medication. (K, S, A)

PO12: Perform and assist in emergency life support procedures, such as endotracheal intubation, tracheostomy, bronchoscopy, and manage invasive and non-invasive ventilation systems, including weaning patients from mechanical ventilation. (K, S, A, C)

Program Structure:

	Broad category of course	**Hours / Credits**	**Course (Title)**
1.	**Discipline-Specific Courses**		
a)	Theory	**I Semester**	
		45 Hours / 3 Credits	Applied Cardiopulmonary Anatomy & Physiology
		45 Hours / 3 Credits	Advanced Respiratory Care I
		45 Hours / 3 Credits	Medical Terminology
		45 Hours / 3 Credits	Research Methodology and Biostatistics
		II Semester	
		45 Hours / 3 Credits	Advanced Respiratory Care II
		45 Hours / 3 Credits	Emergency Medical Care
		45 Hours / 3 Credits	Pulmonary Rehabilitation
		45 Hours / 3 Credits	Bioethics
		III Semester	
		45 Hours / 3 Credits	Mechanical Ventilation I
		45 Hours / 3 Credits	Slee Medicine and Polysomnography
		45 Hours / 3 Credits	Critical Care Medicine I
		45 Hours / 3 Credits	Healthcare Management
		IV Semester	
		45 Hours / 3 Credits	Mechanical Ventilation II
		45 Hours / 3 Credits	Critical Care Medicine II

b)	Practical (SEC)*	**I Semester**	
		120 Hours / 4 Credits	Clinical Skills I
		II Semester	
		120 Hours / 4 Credits	Clinical Skills II
		III Semester	
		120 Hours / 4 Credits	Clinical Skills III
		IV Semester	
		120 Hours / 4 Credits	Clinical Skills IV
c)	Clinical (SEC)*	**I Semester**	
		180 Hours / 6 Credits	Clinical Skills I
		II Semester	
		180 Hours / 6 Credits	Clinical Skills II
		III Semester	
		180 Hours / 6 Credits	Clinical Skills III
		IV Semester	
		180 Hours / 6 Credits	Clinical Skills IV
2.	**Curriculum Enrichment Courses**		
a)	Research Project	12 Credits	Dissertation
3.	**Electives**		
a)	Interdisciplinary Courses	45 Hours / 3 Credits per year	Coursera / Swayam
	Total	**100 Credits**	

8. Attendance:

Each course (theory, practical, clinical etc.) shall be treated as an independent unit for the purpose of attendance. Candidates having minimum 80% attendance in each of the Courses can only qualify to appear for the Semester End Examination. The candidates with less than 80% of attendance shall be required to repeat that Course by attending the semester.

There shall be no provision for condonation of shortage of attendance.

For SWAYAM/MOOC/NPTEL it shall be as per the regulations governing the courses of implementing authority.

The HOD/Course Coordinator through the Dean of Faculties shall announce the names of the candidates who will not be eligible to take the Semester End- Examinations (SEE) in the various courses and send a copy of the same to the Controller of Examinations (COE) Office. Registrations of such candidates for those courses shall be treated as cancelled.

9. Teaching-Learning Methods Course wise:

Teaching - Learning method	Courses
Experiential learning	Clinical Skills I to IV
Integrated/Inter-disciplinary learning	Bioethics, Healthcare Management, Research Methodology and Biostatistics
Participatory learning	Bioethics, Healthcare Management, Applied Cardiopulmonary Anatomy and Physiology Medical Terminology
Problem-solving methodologies	Advanced Respiratory Care I & II Emergency Medical Care Mechanical Ventilation I & II Sleep Medicine and Polysomnography Critical Care Medicine I & II Research Methodology and Biostatistics
Self-directed learning	Applied Cardiopulmonary Anatomy and Physiology Medical Terminology Sleep Medicine and Polysomnography Coursera Swayam
Patient-centric learning	Advanced Respiratory Care I & II Pulmonary Rehabilitation Mechanical Ventilation I & II Critical Care Medicine I & II
Evidence-based learning	Advanced Respiratory Care I & II Mechanical Ventilation I & II Sleep Medicine and Polysomnography

The Humanities	Bioethics
Project-based learning	Pulmonary Rehabilitation Dissertation Research Methodology and Biostatistics
Role-play	Medical Terminology Emergency Medical Care Pulmonary Rehabilitation Bioethics Healthcare Management
Team-work	Advanced Respiratory Care I & II Emergency Medical Care Mechanical Ventilation I & II Critical Care Medicine I & II
Reflective writing	Healthcare Management
Any other (Simulation-Based Learning)	Emergency Medical Care Mechanical Ventilation I & II

10. Scheme of Examination

10.1 Continuous Internal assessment format (distribution of marks)

Continuous Internal assessment components	**Maximum marks**
Average of two IA tests	20
Case Studies/Seminar/Assignments/Quizzes etc.	30
Total marks	50

10.2 Question Paper Pattern

Subjects having maximum marks = 50				Duration
Type of question	Number of questions	Marks for each question	Total	150 min
Long essay type	02	15	30	
Short essay Type	02	10	20	
Total			50	

10.3 Practical Examination

SI.NO	Components	Marks
1	Spotters	10
2	Case Scenario/OSCE/OSPE	20
3	Viva Voce	20
Total Marks		50

10.4. Particulars of practical, viva-voce & dissertation

10.4.1 Practical examination will be aimed at examination of clinical skills and competence of the candidates for undertaking independent work as a specialist.

10.4.2 Viva-Voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence & oral communication skills.

10.4.3 Special emphasis shall be given to dissertation work during the MSc. RT 2ndYear examination.

10.4.4 The marks of Viva-Voce examination shall be included in the clinical examination to calculate the percentage and declaration of results.

10.4.5 OSCE/OSPE-shall have minimum of 5 stations.

10.5 Evaluation and Certification of online courses:

Evaluation will be based on predefined norms and parameters and announced in the overview of the Course at the time of offering the course. Formative continuous online assessments and end of course proctored exams shall be completed by the student.

The certificate obtained shall be submitted to the college office which will be communicated to the office of the Controller of Examinations of Yenepoya (Deemed to be University).

The Yenepoya (Deemed to be) University will give the equivalent credit weightage to the students for the credits earned through online learning courses through MOOCS/Coursera as per the credit plan of the program.

10.6 Credit Mobility of Online Courses:

10.6.1 The Yenepoya (Deemed to be University) will give the equivalent credit weightage to the students for the credits earned through online learning courses as per the credit plan of the program.

10.6.2 In case a student fails to complete the online course he/ she may be allowed to complete the course requirements by registering for another online course in subsequent semester or opt for a course offered at Yenepoya (Deemed to be University), provided such a course is offered during that semester.

10.6.3 The elective course offered by the Yenepoya (Deemed to be University) shall be restricted to a maximum of 3 credits.

10.6.4 A candidate shall compulsorily complete total 6 Credits of Multidisciplinary courses.

10.6.5 These courses shall be selected either from the Generic Electives offered by the Yenepoya (Deemed to be) university or from the SWAYAM/Coursera courses. A Candidate shall have freedom to choose the courses of once own choice and learn at their own pace but, require to complete minimum 3 credits before second semester and 6 credits before third semester SEE.

10.6.6 A candidate who wishes to earn additional credits may be permitted to do so during the academic duration.

10.7 Continuous Internal Assessment Components of PG Dissertation

Sl. No	Parameters		Marks
1.	Maintaining the timeline		10
2.	Presentation a Conference /CME/Publication (student can choose any of the criteria to avail 40 marks)		40
	Criteria	Marks Allocated	
	Online Oral/Online Poster/Offline Poster presentation/Conference proceeding publications in Scopus/WoS indexed journals/Publication of Copyright	20	
	Offline oral presentation at National/International Conference/Patents/Publication of Review Paper/Pilot Study/Study Protocol in Indexed Journal	40	
3.	Manuscript submission (Based on the dissertation) to the Indexed journals (SCOPUS/WoS) along with submission of final dissertation		50
	Total		**100**

10.8. Assessment of Research project

A declaration by the candidate that the work was done by him/her shall be included. The guide, Head of the Department and Head of the Institution shall certify the bonafide of the project.

Total 200 marks shall be awarded for the research project and the marks distribution as follows:

- 100 marks – Dissertation evaluation by Internal and External examiners
- 100 marks – Continuous Internal Assessment

10.9. Evaluation of Dissertation

11.9.1. Dissertation shall be evaluated by two examiners, one external & one Internal for 100 marks from the panel of examiners approved by the Board of Studies and by the University.

11.9.2. The criteria for the evaluation shall be as prescribed by the Board of Studies.

11.9.3. Acceptance of the dissertation is a pre-requisite for a candidate to be eligible to appear in the final examination.

10.10 Guide:

The academic qualification and teaching experience required for recognition of guide shall be as given under:

DM in Respiratory/Pulmonary Medicine with 2 years of teaching experience after MD/DM programme or Ph.D in Respiratory Therapy or M.Sc. Respiratory Therapy with teaching experience of four years after the Masters programme.

Student guide ratio: A recognized guide shall supervise dissertation work of not more than five students per academic year. The age of the guide shall not exceed 65 years.

Co-Guide may be included provided the work requires substantial contribution from a sister department, another institution recognized for teaching in Yenepoya (Deemed to be University), or any other State level University.

Change of Guide: In the event of registered guide leaving the Institute/ college due to any reason or in the event of death or any other valid reasons, guide can be changed with prior permission from the University only.

11 Eligibility to appear for University Examination

Each course (theory, practical, clinical etc.) shall be treated as an independent unit for the purpose of attendance. Candidates having minimum 80% attendance in each of the Courses can only qualify to appear for the Semester End Examination. The Candidates with less than 80% of attendance shall be required to repeat that Course by attending the semester. There shall be no provision for condonation of shortage of attendance.

Evaluation of a course shall be done based on continuous internal assessment (CIA) mode followed by semester end university examination (SEE) for each course.

The components of CIA (Continuous Internal Assessment) may include sessional tests, Seminar/ Journal Club/ Case Studies /Assignment and other activities as determined by the board of studies in the respective departments.

The CIA:SEE percentage is 50:50 and minimum marks for CIA shall be 50% and SEE shall be 50%. The pass marks per course shall be 50%.

There shall be examinations at the end of each semester ordinarily during February/March for odd semesters and August/September for even semesters. The SEE duration shall be two and half hours.

12 Criteria for passing

The CIA:SEE percentage is 50:50 and minimum marks for CIA shall be 50% and SEE shall be 50%. The pass marks per course shall be 50%

A candidate shall be declared to have passed the PG program if he/she secures atleast CGPA of 5.0 (Course Alpha-Sign Grade P) in the aggregate of both internal assessment and semester end examination marks.

The candidates who pass all the semester examinations in the first attempts in Two years are eligible for ranks provided they secure at least a CGPA of 8.0 (atleast Alpha-Sign Grade A).

The results of the candidates who have passed the fourth semester examination but not passed the lower semester examinations shall be declared as NCL (Not Completed Lower semester examinations). Such candidates shall be eligible for the degree only after completion of all the lower semester examinations.

A candidate who passes the semester examinations in parts is eligible for only CGPA and Alpha-Sign Grade but not for ranking.

There shall be no minimum marks with respect to internal assessment and viva-voce marks.

A candidate who fails in any of the project work/project report/dissertation shall reappear for the same and pass the examination subsequently within the nearest semester and examination schedule.

13 Carry over provisions

Carry over shall be allowed to the candidates up to IV semesters.

14 Grading and Classification

The results of successful candidates at the end of each semester shall be declared in terms of Grade Point Average (GPA) and Alpha-Sign Grade. The results at the end of the sixth semester shall be classified on the basis of the Cumulative Grade Point Average (CGPA) obtained in all the four semesters and the corresponding overall alpha sign grade.

14.1Letter Grades and Grade Points:

Letter Grade	Grade Point	Range of Marks
O+(Outstanding)	10	90–100
O(Excellent)	9	80–89.99
A+(Very Good)	8	70–79.99
A(Good)	7	60–69.99
B+(Average)	6	55–59.99
P(Pass)	5	50–54.99
F(Fail)	<5	<50

14.2Cumulative Grade Point Average (CGPA):

The results at the end of the fourth semester shall be classified on the basis of CGPA obtained in the four semesters and the corresponding overall letter grade. The letter grade as described below shall be adopted.

Letter Grade	CGPA Range
O+(Outstanding)	9.0–10.0
O(Excellent)	8.0–8.99
A+(Very Good)	7.0–7.99
A(Good)	6.0–6.99
B+(Average)	5.5–5.99
P(Pass)	5.0–5.49
F(Fail)	<5.0

15. JOURNALS

List of Journals:

- Respiratory Care
- Critical Care
- Indian Journal of Respiratory Care

SEMESTER I

APPLIED CARDIOPULMONARY ANATOMY AND PHYSIOLOGY

Course: Core

Number of Credits: 3 **No of hours: 45**

Course Outcome:

- The student will learn the fundamentals of Anatomy and Physiology that will aid for the respiratory care practice.
- The topics covered in this course include Anatomy and Physiology of Respiratory system, Cardiovascular system and as well as the effect of environment, age and exercise on these systems.
- This course enables to explain the effects of various factors on cardiopulmonary systems

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	4	**Development of cardiopulmonary system** 1.1 Distinguish the various gestational age and developmental event of cardiopulmonary event in fetus	✔			10	LE, SE
		1.2 Explain the fetal circulation.		✔			
		1.3 Explain the cardiopulmonary events that occur during transition from intrauterine to extrauterine life		✔			
		1.4 Distinguish the difference between neonatal and adult respiratory system	✔				

II	3	**Anatomy of respiratory system** 2.1 Describe the contents of the upper and lower respiratory system	✔			10	LE, SE
		2.2 Describe the anatomy of oral cavity, nasal cavity, pharynx, larynx	✔				
		2.3 Explain the muscles of the respiratory system and its function	✔				
III	4	**Anatomy of cardiovascular system** 3.1 Explain the anatomy of the heart		✔		5	LE, SE
		3.2 Distinguish between pulmonary and systemic vascular structure		✔			
		3.3 Explain briefly about coronary circulation			✔		
		3.4 Explain the various cardiac muscle fibers			✔		
IV	3	**Regulation of breathing** 4.1 Describe about the respiratory centers	✔			5	LE, SE
		4.2 Explain the chemical control of breathing	✔				
		4.3 Discuss the ventilatory response to exercises			✔		
V	2	**Regulation of blood pressure and cardiac output** 5.1 Explain the regulation of blood pressure, peripheral vasculature	✔			5	LE, SE
		5.2 Explain the factors regulating cardiac output	✔				
VI	2	**Cardiac cycle** 6.1 Explains the events		✔		5	LE, SE
		6.2 Explain the factors affecting cardiac cycle		✔			

VII	5	**Gas exchange and transport** 7.1 Explain various laws of diffusion			✔	10	LE, SE
		7.2 Distinguish normal variation from ideal gas exchange	✔				
		7.3 Explain oxygen transport	✔				
		7.4 Explain carbon dioxide transport	✔				
		7.5 Distinguish the various abnormalities of gas exchange and transport		✔			
VIII	2	**Gas exchange in different situations** 8.1 Discuss gas exchange during exercise			✔	5	LE, SE
		8.2 Discuss gas exchange during high and low pressures			✔		
IX	2	**Lung volumes and capacities** 9.1 Define various volumes and capacity of lungs			✔	5	LE, SE
		9.2 Sketch a spirogram and explain the volumes and capacity	✔				
X	3	**Mechanics of breathing** 10.1 Explain the mechanism of inspiration	✔			5	LE, SE
		10.2 Explain the mechanism of expiration	✔				
		10.3 Explain the mechanics of ventilation and its components like compliance, resistance, time constants and work of breathing	✔				
XI	4	**Ventilation- Perfusion relationship** 11.1 Regional and local factors affecting distribution of ventilation	✔			10	LE, SE

		11.2 Regional differences in ventilation to perfusion ratio	✔				
		11.3 Normal ventilation to perfusion ratio and causes for abnormal V/Q ratio	✔				
		11.4 Explain how shunt and dead space affect V/Q ratio	✔				
XII	4	**Acid Base balance** 12.1 Define pH, acid, base and hydrogen ion regulation in body fluid		✔		10	LE, SE
		12.2 Explain bicarbonate buffer system in body		✔			
		12.3 Explain non-bicarbonate buffer system in body		✔			
		12.4 Distinguish various mechanism of acid excretion	✔				
XIII	2	**Solutions, body fluids and electrolytes** 13.1 Assess laboratory data and physical signs and symptoms for evaluation of fluid and electrolyte status		✔		5	LE, SE
		13.2 Fluid mechanism (Starling's law)	✔				
XIV	5	**Basics of sleep physiology** 14.1 Define sleep apnea, hypopnea			✔	10	LE, SE
		14.2 Categorize sleep disorders			✔		
		14.3 Explain polysomnography		✔			
		14.4 Distinguish various stages of sleep	✔				
		14.5 Explain the treatment measures of sleep apnea	✔				

LE: Long Essay, SE: Short Essay

Books Recommended:

- Terry Des Jardins Cardiopulmonary anatomy and physiology – Essentials of respiratory care 7th edition.
- West's Respiratory physiology- The essentials 10th edition
- Egan's Fundamentals of Respiratory care 12th Edition

ADVANCED RESPIRATORY CARE – I

Course: Core

Number of Credits: 3 **No of hours:45**

Course Outcome

- Explain about the various diagnostic techniques used for assessing cardiorespiratory function
- Basic and advanced airway management devices

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	5	**Patient encounter and medical history taken** 1.1 Key elements of patient care			✔	10	LE, SE
		1.2 Technique for efficient patient interview	✔				
		1.3 Patient history	✔				
		1.4 Components of history taking	✔				
		1.5 Reviewing the patient chart		✔			
II	5	**Physical examination and vital signs** 2.1 Components of physical examination of lungs and thorax	✔			10	LE, SE
		2.2 Normal vital signs	✔				

		2.3 Deviations of the vital signs from the normal values	✔				
III	5	**Cardiopulmonary signs and symptoms** 3.1 Classify cardiopulmonary disorders based on the symptoms	✔			10	LE, SE
		3.2 Characteristics of cardiopulmonary symptoms	✔				
IV	5	**Hemodynamic monitoring** 4.1 Invasive and non-invasive hemodynamic monitoring			✔	10	LE, SE
		4.2 Indications and contraindications of hemodynamic monitoring	✔				
		4.3 Components of hemodynamic monitoring	✔				
		4.4 Devices to assess hemodynamic stability	✔				
V	5	**Arrhythmias, pacing and cardioversion** 5.1 Normal ECG waveforms	✔			10	LE, SE
		5.2 Basic interpretation of ECG	✔				
		5.3 Identification of arrhythmias Indication and contraindication of cardioversion and cardiac pacing	✔				
VI	4	**Ionotropic therapy in critically ill** 6.1 List of various ionotropic therapy			✔	10	LE, SE
		○ Indication, contraindication of ionotropic therapy	✔				
		6.3 MOA, adverse effects of ionotropic therapy	✔				
VII	5	**Oxygenation monitoring** 7.1 Non-invasive method for oxygenation monitoring	✔			10	LE, SE

		7.2 Principles of oxygenation monitoring devices	✔				
		7.3 Factors affecting the performance and troubleshooting	✔				
VIII	4	**Airway management** 8.1 Types of artificial airway devices		✔		10	LE, SE
		8.2 Difficult airway management	✔				
IX	5	**Blood gas analysis and interpretation** 9.1 Systematic interpretation of ABG	✔			10	LE, SE
		9.2 Simple, combined and mixed acid base disturbances		✔			
		9.3 Errors in ABG analysis	✔				
X	2	**Brain death Evaluation** 10.1 Examination of reflexes		✔		10	LE, SE
		10.2 Apnea Test	✔				

LE: Long Essay, SE: Short Essay

References:

- Bersten AD, Handy J. Oh's Intensive Care Manual E-Book. Elsevier Health Sciences; 2013 Oct 31.
- Irwin RS, Rippe JM, editors. Procedures, techniques, and minimally invasive monitoring in intensive care medicine. Lippincott Williams & Wilkins; 2008.
- Egan's Fundamentals of Respiratory care 12th Edition

MEDICAL TERMINOLOGY

Course: Core

Number of Credits: 3 **No of hours:45**

Course Outcomes

- They should be able to break down the words and interpret the medical meaning.
- Basic knowledge of elements of medical words, suffix and prefix.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	2	**Basic Elements of a Medical Word** 1.1 Identify the four-word elements used to build medical words.			✔	5	LE, SE
		1.2 Identify the medical terms			✔		
II	3	**Suffix & Prefix** 2.1 Define and provide examples of surgical, diagnostic pathological, and related suffixes			✔	5	LE, SE
		2.2 Define common prefixes used in medical terminology			✔		
		2.3 Explain how a prefix changes the meaning of a medical word.			✔		
III	3	**Body Structure** 3.1 Define and identify three planes of the body.		✔		5	LE, SE

		3.2 Identify the cavities, quadrants, and regions of the body.		✔			
		3.3 List and identify terms related to direction, position, and planes of the body.		✔			
IV	1	**Integumentary System** Analyze and classify the medical terms related to the integumentary system.	✔			5	LE, SE
V	3	**Digestive System** 5.1 Spell and build words related to the digestive system.		✔		5	LE, SE
		5.2 Explain the terms related to diseases, conditions, and procedures of the digestive system	✔				
		5.3 Analyze and classify the medical terms related to the digestive system	✔				
VI	4	**Respiratory System** 6.1 Spell, and build words related to the respiratory system.		✔		15	LE, SE
		6.2 Explain the terms related to diseases, conditions, and procedures of the respiratory system	✔				
		6.3 Explain pharmacological terms related to the treatment of respiratory disorders	✔				
		6.4 Analyze and classify the medical terms related to the respiratory system	✔				
VII	4	**Cardiovascular System** 7.1 Spell, and build words related to the cardiovascular system.		✔		15	LE, SE

		7.2 Explain the terms related to diseases, conditions, and procedures of the cardiovascular system	✔				
		7.3 Explain pharmacological terms related to the treatment of cardiovascular disorders	✔				
		7.4 Analyze and classify the medical terms related to the cardiovascular system	✔				
VIII	3	**Blood, Lymph and Immune Systems** 8.1 Spell, and build words related to the blood, lymph, and immune systems.		✔		5	LE, SE
		8.2 Explain the terms related to diseases, conditions, and procedures of the blood, lymph, and immune systems.	✔				
		8.3 Analyze and classify the medical terms related to the blood, lymph, and immune systems	✔				
IX	4	**Musculoskeletal System** 9.1 Spell, and build words related to the musculoskeletal system.		✔		10	LE, SE
		9.2 Explain the terms related to diseases, conditions, and procedures of the musculoskeletal system	✔				
		9.3 Explain pharmacological terms related to the treatment of musculoskeletal system	✔				
		9.4 Analyze and classify the medical terms related to the musculoskeletal system	✔				
X	3	**Urinary System**		✔		5	LE, SE

		10.1 Spell, and build words related to the urinary system.					
		10.2 Explain the terms related to diseases, conditions, and procedures of the urinary system	✔				
		10.3 Analyze and classify the medical terms related to the urinary system	✔				
XI	3	**Female Reproductive System** 11.1 Spell, and build words related to the female reproductive system.		✔		5	LE, SE
		11.2 Explain the terms related to diseases, conditions, and procedures of the female reproductive system	✔				
		11.3 Analyze and classify the medical terms related to the female reproductive system	✔				
XII	3	**Male Reproductive System** 12.1 Spell, and build words related to the male reproductive system.		✔		5	LE, SE
		12.2 Explain the terms related to diseases, conditions, and procedures of the male reproductive system	✔				
		12.3 Analyze and classify the medical terms related to the male reproductive system	✔				
XIII	3	**Endocrine System** 13.1 Spell, and build words related to the endocrine system.		✔		5	LE, SE
		13.2 Explain the terms related to diseases, conditions, and procedures of the endocrine system	✔				

		13.3 Analyze and classify the medical terms related to the endocrine system	✔				
XIV	3	**Nervous System** 14.1 Spell, and build words related to the nervous system.		✔		5	LE, SE
		14.2 Explain the terms related to diseases, conditions, and procedures of the nervous system.	✔				
		14.3 Analyze and classify the medical terms related to the nervous system	✔				
XV	3	**Special Senses** 15.1 Spell, and build words related to the special senses.		✔		5	LE, SE
		15.2 Explain the terms related to diseases, conditions, and procedures of the special senses.	✔				
		15.3 Analyze and classify the medical terms related to the special senses	✔				

LE: Long Essay, SE: Short Essay

Books Recommended:

1. Medical terminology system approach - Barbara A. Gylys. Regina M. Masters. — Seventh edition.
2. Ehrlich A, Schroeder CL, Ehrlich L, Schroeder KA. Medical terminology for health professions 6th edition. Nelson Education; ISBN-10: 130563435
3. Rice J. Medical Terminology for Health Care Professionals. Pearson;9th edition; ISBN-10: 0134495349

RESEARCH METHODOLOGY & BIOSTATISTICS

Course: Core

Number of Credits: 3 **No of hours:45**

Research Methodology

Course Learning Objectives:

CLO1: To describe the types, need and process of research

CLO2: To outline the process and purpose of literature review

CLO3: To explain various biomedical research designs with advantages and disadvantages.

CLO4: To outline the process involved in data collection and analysis

CLO5: To explain the components of research paper and process of publication

Course Content:

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	2	**Introduction** 1.1 Need for research	✔			10	SE
		1.2 Types of research	✔				
		1.3 Outlining the research process	✔				
II	2	**Review of Literature** 2.1 Importance, sources & steps	✔			10	SE

		2.2 Critical appraisal of SE research article	✔				
III	2	**Research Design** 3.1 Types of research – Qualitative & Quantitative	✔			10	LE, SE
		3.2 Experimental & Non Experimental, Survey – advantages & disadvantages	✔				
IV	2	**Research Process** 4.1 Framing a research question	✔			15	LE, SE
		4.2 Research title	✔				
		4.3 Aim & Objectives, Assumptions, Limitations & Delimitations, Variables	✔				
		4.4 Hypothesis – formation & testing	✔				
V	2	**Data collection & Analysis** 5.1 Data sources, technique of data collection, tools	✔			20	LE, SE
		5.2 Reliability & validity	✔				
		5.3 Process of data collection					
		5.4 Pilot study – method, need	✔				
VI	2	**Interpretation & presentation of data** 6.1 Qualitative &	✔			15	LE, SE

		quantitative analysis.					
		6.2 Graphical representation of data	✔				
		6.3 Conclusion & discussion	✔				
VII	2	**Discussion, Conclusion and References**	✔			10	SE
VIII	2	**Essentials of writing a research paper along with process of publication**	✔			10	LE

LE: Long Essay, SE: Short Essay

Course Outcome:

At the end of the Course, the students will

• have knowledge of process involved in Biomedical research from formulation to publication.

• be able to draft a research proposal

Biostatistics

Course Learning Objectives:

CLO 1: To Understand the Statistical Terms.

CLO 2: To Possess Knowledge and Skill in the use of Basic Statistical and Research Methodology.

Course Content:

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	6	**Introduction** 1.1 Introduction to biostatistics & research methodology, types of variables & scales of measurements, measure of central tendency & dispersion, rate, ratio, proportion, incidence & prevalence	✔			5	LE, SE
II	3	**Sampling** 2.1 Population & Sample, Sampling and non-sampling errors and methods of minimizing these errors, Random and non-random sampling, different sampling techniques – simple random, stratified, systematic, cluster&	✔			10	LE, SE

		multistage.					
III	3	**Sampling Distributions** 3.1 Parameter and Statistic. Standard error. Basic probability distributions - Normal, poisson, binomial distributions with their applications in biological sciences.	✔			5	SE
IV	6	**Tests of Significance** 4.1 Basics if testing of hypothesis – Null & Alternative hypothesis, type 1 and type II errors, level of significance (parametric) & power of the tests, p value, Confidence interval. Tests of significance – T test (paired &UN paired), Chi square test & Test of proportion, One way analysis of variance. Repeated measures analysis of variance. Tests of significance (nonparametric) – Mann – Whitney U Test, Wilcoxon Test, Kruskal – Wallis Analysis of variance, Friedmann's Analysis of variance	✔			15	LE, SE
V	3	**Correlation and Regression** 5.1 Linear correlation by Karl Pearson and rank order correlation due to Spearman, Testing the significance of correlation co efficient, simple linear regression – estimation & testing, residual plots, multiple linear regression..	✔			15	LE

VI	2	**Sample size Determination** 6.1 General concept. Sample size for estimating means and proportion, testing of difference in means and proportions of two groups.	✔			5	SE
VII	2	**Study designs** 7.1 Epidemiological methods – case series analysis and prevalence studies. Analytical epidemiological methods – case control and cohort studies. Clinical trials / intervention studies, odds ratio and relative risk, stratified analysis	✔			10	SE
VIII	2	**Multivariate analysis** 8.1 Concept of multivariate analysis, introduction to logistic regression and survival analysis	✔			15	LE, SE
IX	1	**Reliability and validity of diagnostic tests** 9.1 Sensitivity, Specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV), ROC curve	✔			10	LE, SE
X	1	**Format of scientific documentations** 10.1 Structure of research protocols, structure of thesis/research report, formats of reporting in scientific journals. Systematic review and meta-analysis	✔			10	LE, SE

LE: Long Essay, SE: Short Essay

Course Outcome:

At the end of the Course, the students will be able to

• Able to distinguish different data types, variables and scales of measurement

• Able to organize, tabulate and present data through tables and graphs. Compute and interpret descriptive statistics

• Able to compute and interpret sensitivity, specificity, PPV, NPV and ROC Analysis.

• Able to determine sample size and use of random sampling methods.

• Able to interpret Power of a test, Level of significance, p value and confidence interval. Use of t-test, ANOVA and m3ultiple comparison.

• To interpret the commonly used parametric and nonparametric tests and how to report the findings.

• Carryout correlation analysis and interpret the results

• Perform regression analysis and draw conclusions of the analysis. Use the regression model for predictions.

Reference Books:

1. Rao NSN : Applied statistics in health sciences, JP publishers
2. Mahajan B.K: Methods of biostatistics, Kothari book depot, A.D Marg, Bombay
3. Potti L.R: A text book of statistics, Yamuna publications, Sreekanteshwaram,Trivandrum.
4. Lancaster H.O: Introduction to medical statistics, Johnwiley& sons, New York.
5. Leius A.E: Biostatistics, Reinhold publishing Co, New York.
6. Cotton T: Statistics in medicine, Little Brown & Co, Boston.
7. Hill A.B: Principles of medical statistics, Oxford University press, New York

CLINICAL SKILLS - I

Course: Core

Number of Credits: 12 **No of hours:300**

Course Learning Objectives:

This course will provide a practical and demonstrative approach about diagnostic procedures and case study. It comprises of clinical postings and practicum and demonstration classes.

Course Content

Sl.No.	TOPIC
1	Demonstration of patient contact techniques
2	Practicum & demonstration on assessment of RS, CVS, CNS and other organ system
3	Practicum & demonstration on airway management
4	Practicum & demonstration on use advanced artificial airways
5	Practicum on selection of oxygen therapy devices
6	Practicum and case presentation interpretation of ECG.
7	Practicum & demonstration on equipment selection.
8	Practicum on Respiratory monitoring of critically ill
9	Practicum on sleep stages
10	Practicum and demonstration on infection control procedures
11	Practicum on evidence based practices

Course Outcome:

At the end of the course, the student should be able to know:

- Identify the clinical features and perform the assessments accordingly
- Perform and interpret the diagnostic reports
- Perform evidence-based management strategies for critically ill patients
- Titrate and troubleshoot the ventilator settings as per the clinical condition

SEMESTER II

ADVANCED RESPIRATORY CARE – II

Course: Core

Number of Credits: 3 **No of hours: 45**

Course Learning Objectives

The students should have basic and advanced knowledge on the assessment used in intensive care units and bedside protocol. They will be familiarized with the devices that are used in respiratory system assessment and selection of the equipment or a particular procedure.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	4	**Pulmonary function testing**	✔			10	LE, SE
II	4	**Imaging modalities**	✔			10	LE, SE
III	2	**Lung ultrasound**		✔		5	LE, SE
IV	2	**E-FAST ultrasound**		✔		5	LE, SE
V	2	**Echocardiography**			✔	5	LE, SE
VI	2	**Lumbar puncture procedure and protocol**			✔	5	LE, SE
VII	4	**Emergency bedside procedures**	✔			10	LE, SE
VIII	3	**Central venous catheterization**	✔			5	LE, SE

IX	3	**Pulmonary artery catheterization**	✔			5	LE, SE
X	2	**Bronchoscopy, BAL culture**	✔			5	LE, SE
XI	2	**Clinical laboratory studies**		✔		5	LE, SE
XII	3	**Neurological monitoring in ICU**	✔			5	LE, SE
XIII	2	**Nutritional assessment**		✔		5	LE, SE
XIV	2	**Severity scoring systems in ICU**	✔			5	LE, SE
XV	2	**Routine care of critically ill patients**		✔		5	LE, SE
XVI	3	**Transport of critically ill patients**	✔			5	LE, SE
XVII	3	**Extracorporeal membrane oxygenation (ECMO)**	✔			5	LE, SE

LE: Long Essay, SE: Short Essay

Course Outcome

- Outline the diagnostic tools used in the cardiorespiratory assessment
- Explain about the bedside diagnostic techniques for assessing critically ill
- Explain about the scoring systems used in the critically ill patients
- Discuss the overall diagnostic plan and outline a management strategy

References :

- Bersten AD, Handy J. Oh's Intensive Care Manual E-Book. Elsevier Health Sciences; 2013 Oct 31.
- Irwin RS, Rippe JM, editors. Procedures, techniques, and minimally invasive monitoring in intensive care medicine. Lippincott Williams & Wilkins; 2008.
- Des Jardins T. Cardiopulmonary Anatomy & Physiology: Essentials of Respiratory Care. Cengage Learning; 2012 Apr 3.
- Egan's Fundamentals of Respiratory care 12th Edition

EMERGENCY MEDICAL CARE

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

The course is designed to provide basic and advanced knowledge on systematic approach to any life threatening emergencies. This course enbales students to be updated on the systematic approach towards the cardiopulmonary arrest management, airway management, cardiac arrythmias, trauma care as per the guidelines

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	3	**Trauma assessment and management** 1.1 Vital component of patient assessment during trauma life support			✔	10	LE, SE
		1.2 Primary survey of trauma care	✔				
		1.3 Rapid trauma survey and focused assessment	✔				
		1.4 Secondary survey and ongoing assessment	✔				

II	4	**Respiratory arrest scenario** 2.1 The signs and symptoms of respiratory distress and arrest			✔	5	LE, SE
		2.2 Foreign body airway obstruction	✔				
		2.3 Management of FBAO	✔				
		2.4 Systematic approach of respiratory arrest scenarios	✔				
III	3	**Airway Management – Basic airway management** 3.1 Assess the patient for patent airway		✔		5	LE, SE
		3.2 Airway selection, use and preparation for the following artificial airways during trauma care. a. Nasopharyngeal airways b. Oropharyngeal airways c. Blind insertion airway devices (LMA, Laryngeal Tube device and combi tube.	✔				
IV	4	**Airway Management – Advanced airway management** 4.1 Assess the patients for difficult airway		✔		10	LE, SE
		4.2 Airway selection, use and preparation for the endotracheal intubation	✔				
		4.3 Explain the difficult airway management in the trauma (updated algorithms)	✔				

V	4	**Thoracic emergency and management** 5.1 Thoracic emergencies during thoracic trauma scenarios		✔		15	LE, SE
		5.2 Emergency management of thoracic traumas a.Airway obstruction b. Flail chest c. Open pneumothorax d. Massive hemothorax e. Tension pneumothorax f. Cardiac tamponade g. Myocardial contusion h. Traumatic aortic rupture i. Tracheal or Bronchial tree injury j. Diaphragmatic tears k. Pulmonary contusion	✔				
		5.3 Explain needle thoracocentesis, Pericardiocentesis, Spinal stabilization	✔				
VI	4	**Circulatory failure in trauma** 6.1 Explain the pathophysiology of shock during trauma	✔			15	LE, SE
		6.2 Explain the assessment of shock patients during trauma	✔				
		6.3 Explain different types of shock	✔				
		6.4 Explain the different clinical features observed and management in the following shock cases a. Hypovolemic shock	✔				

		b. Obstructive shock c. Distributive shock d. Cardiogenic shock					
		6.5 Hypertensive emergencies		✔			
VII	4	**Systematic approach in cardiac arrest scenarios** 7.1 Basic life support	✔			10	LE, SE
		7.2 Primary and secondary assessment	✔				
		7.3 Advanced Cardiac Life support	✔				
		7.4 Circulatory adjuncts		✔			
VIII	5	**Cardiac Arrhythmias** 8.1 Identify the cardiac arrest scenarios and the management of the following arrhythmias		✔		10	LE, SE
		8.2 Ventricular fibrillation / Pulseless VT	✔				
		8.3 Aystole/ PEA	✔				
		8.4 Bradyarrhythmias / Tachyarrhythmias	✔				
IX	3	**Post cardiac arrest care** 9.1 Identify ROSC in cardiac arrest		✔		5	LE, SE
		9.2 Appropriate management strategy for post ROSC case	✔				
		9.3 Post cardiac arrest care management for a cardiac arrest scenario	✔				

X	5	**Cerebral resuscitation post cardiac arrest** 10.1 Appropriate cerebral management for a cardiac arrest case post ROSC		✔		5	LE, SE
		10.2 Targeted temperature monitoring, assessment of neurological activity, and monitoring post ROSC		✔			
XI	6	**Special resuscitation situations** 11.1 Resuscitation guideline for the following condition a. Drowning b. Cardiac arrest associated with trauma. c. Electric shock and lightening emergency d. Cardiac arrest associated with pregnancy. e. Cardiac arrest associated with toxicologic emergency	✔			10	LE, SE

LE: Long Essay, SE: Short Essay

Course Outcome

Students will be able to :

- Understand the systematic approach in trauma care scenarios
- Explain and perform the basic and advanced cardiac life support as per the AHA guidelines
- Interpret the diagnostic report and intervene accordingly
- Explain and perform airway management skills
- Manage cardiopulmonary arrest scenarios

References

- Roy L. Alson, Kyee Han, John E. Campbell, International trauma life support for emergency care providers, ISBN: 9780135379318 2.
- American Heart Association, Basic life support and advanced cardiovascular life support manual, 2020 AHA guidelines, ISBN: 978-161669-404-3
- Andrew D Bersten, Oh's Intensive Care Manual, 8th edition, ISBN: 9780702072215 2.
- John. J. Marini, Critical Care Medicine: The Essentials, 4th edition, ISBN: 9781496302915

PULMONARY REHABILITATION

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

The course is designed to familiarize the students about the approach towards pulmonary rehabilitation . The course also trains students on how to provide home care ventilatiton and pulmonary rehabilitation for patients with undelying cardiopulmonary condition ensuring safe practice.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	3	**Overview of pulmonary rehabilitation** 1.1 Definition and scope of pulmonary rehabilitation			✔	5	LE, SE
		1.2 The burden of chronic respiratory disease	✔				
		1.3 A brief history of pulmonary rehabilitation			✔		
		1.4 Essential components of pulmonary rehabilitation	✔				
		1.5 Prevention		✔			
		1.6 Patient goals, Program goals, Philosophy, Code of ethics for the pulmonary rehabilitation specialist	✔				

II	3	**Selection and assessment of the pulmonary rehabilitation candidate** 2.1 Patient selection and assessment	✔			10	LE, SE
		2.2 Goal development and rehabilitation potential			✔		
III	3	**Patient education and skills training** 3.1 Education process, Focus and scope of educational and skills training	✔			10	LE, SE
IV	4	**Exercise assessment and training** 4.1 Exercise assessment	✔			10	LE, SE
		4.2 Functional performance assessment Exercise training		✔			
		4.3 Emergency procedures	✔				
V	3	**Psychosocial assessment and intervention** 5.1 Adjustment process			✔	10	LE, SE
		5.2 Psychosocial assessment	✔				
		5.3 Psychosocial intervention	✔				
VI	4	**Outcome assessment** 6.1 Timing of patient centered outcome measurement		✔		5	LE, SE
		6.2 Domains of outcome measurement	✔				
VII	12	**Disease specific approach in pulmonary rehabilitation** 7.1 Asthma, Cystic fibrosis, Interstitial lung diseases	✔			15	LE, SE

		7.2 Obesity related respiratory disorders	✔				
		7.3 Neuromuscular and chest wall disorders	✔				
		7.4 Lung volume reduction surgery, Lung transplantation	✔				
		7.5 Lung cancer and thoracoabdominal surgery	✔				
		7.6 Mechanical ventilation	✔				
		7.7 Pediatric patients with respiratory disease		✔			
		7.8 Patients with coexisting pulmonary and cardiac disease		✔			
		7.9 Pulmonary hypertension	✔				
		7.10 Special considerations in pulmonary rehabilitation			✔		
VIII	5	**Program management** 8.1 Program components and structure: Interdisciplinary team	✔			10	LE, SE
		8.2 Program structure and Staff competencies, Strategies for program success, Medical director, program director and rehabilitation specialist		✔			
		8.3 ATS Guidelines for six minute walk test, Forms, questionnaires and assessment	✔				
IX	3	**Therapeutic intervention in pulmonary rehabilitation** 9.1 Ventilatory muscle training	✔			15	LE, SE
		9.2 Nutritional assessment and support	✔				
		9.3 Tobacco dependence: pathophysiology and treatment	✔				

X	5	**Other Pulmonary Rehabilitation Program** 10.1 Home Mechanical ventilation	✔			10	LE, SE
		10.2 Surgical disorder in pulmonary patients	✔				
		10.3 Sleep disorders		✔			
		10.4 Dyspnea assessment and management	✔				

LE: Long Essay, SE: Short Essay

Course outcome:

- Define the basic concepts , and rationale in pulmonary rehabilitation
- Explain the physiology of exercise intolerance in patients with chronic respiratory disorders
- Explain and apply the strenth and endurance training in patients with chronic lung disorders
- Prescribe exercises for selective patients and apply different intervention techniques to impove the patients condition

References

- Hodgkin JE, Celli BR, Connors GL, editors. Pulmonary rehabilitation: guidelines to success. Lippincott Raven; 2000.
- Bauldoff G, Carlin BW. AACVPR Guidelines for Pulmonary Rehabilitation Programs.
- Clini E, Holland AE, Pitta F, Troosters T, editors. Textbook of pulmonary rehabilitation. New York: Springer International Publishing; 2018.

BIOETHICS

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

The course is designed to familiarize the students about the approach towards pulmonary rehabilitation . The course also trains students on how to provide home care ventilatiton and pulmonary rehabilitation for patients with undelying cardiopulmonary condition ensuring safe practice.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	5	**Introduction to bioethics** 1.1 Definition and scope of bioethics	✔			10	LE, SE
		1.2 History of bioethics		✔			
		1.3 Codes of ethics	✔				
II	5	**Ethical principles and theories** 2.1 The ethical principles	✔			30	LE, SE
		2.2 Ethical theories and their	✔				
		2.3 Application of ethical theories and principles in healthcare	✔				

III	10	**Ethics in healthcare** 3.1 Consent	✔			20	LE, SE
		3.2 Risk: benefit analysis	✔				
		3.3 Distributive justice		✔			
		3.4 Privacy and confidentiality	✔				
		3.5 Stigma and discrimination		✔			
		3.6 Health technology assessment			✔		
		3.7 Public health ethics	✔		✔		
IV	15	**Specific ethical issues in Healthcare** 4.1 End of life care and euthanasia	✔			10	SE
		4.2 Artificial reproductive techniques			✔		
		4.3 Medical termination of pregnancy		✔			
		4.4 Pre-natal sex determination		✔			
		4.5 Oxygen Donation		✔			
		4.6 Medical errors and truth telling	✔				
		4.7 Medical negligence and malpractice	✔				
V	10	**Research Ethics** 5.1 Research ethics principles	✔			30	LE, SE
		5.2 Informed consent	✔				
		5.3 Vulnerability in research	✔				
		5.4 Responsible conduct of research	✔				

		5.5 Publication ethics	✔				

LE: Long Essay, SE: Short Essay

References

1. English DC. Bioethics a Clinical Guide for Medical Students.

2. Tayaoe M.C. Textbook of Medical Bioethics, Attitude and Communication for Medical Students; 2016 Feb 28

3. Princy Louis Palatty. A Textbook of Bioethics for Healthcare Professionals 1st Edition; 2018.

CLINICAL SKILLS II

Course: Core

Number of Credits: 12 **No of hours:300**

Course Learning Objectives:

This course will provide a practical and demonstrative approach about diagnostic procedures and case study. It comprises clinical postings and practicum and demonstration classes.

Sl.No.	TOPIC
1.	Practicum on Pulmonary Function tests includes Spirometry, DLCO.
2.	Practicum on Pulmonary Function tests includes, body plethysmography and bronchial provocation tests
3.	Practicum on technical aspects and interpretation of Chest X-ray, CT chest.
4.	Practicum on technical aspects and interpretation of lung ultrasound.
5.	Practicum & demonstration on Chest tube drainage procedures
6.	Practicum & demonstration on bronchoscopy
7.	Practicum & demonstration on BLS and ACLS procedure.
8.	Practicum & demonstration on Trauma care management procedure.
9.	Practicum and demonstration on airway clearance therapy
10.	Practicum and demonstration on cardiopulmonary exercise testing
11.	Practicum and demonstration of six minute walk test
12.	Practicum and demonstration on respiratory muscle training
13.	Practicum on Transport of critically ill.

Course Outcome:

At the end of the course, the student should be able to know:

- Identify the clinical features and perform the assessments accordingly
- Perform and interpret the diagnostic reports
- Perform evidence based management strategies for critically ill patients
- Titrate and troubleshoot the ventilator settings as per the clinical condition

SEMESTER III

MECHANICAL VENTILATION - I

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

This course is designed to build the knowledge for Respiratory Therapy students, about the basic terminologies and technical aspects of mechanical ventilation. This course also covers the working principles of mechanical ventilators, different modes of ventilation and various monitoring aspects.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	3	**Terminologies and Functional Concepts of Mechanical Ventilation** 1.1. Physiological terms and Concepts related to Mechanical Ventilation	✔			10	LE, SE
		1.2 Normal Mechanics of Spontaneous Ventilation	✔				
		1.3 Lung Characteristics and Time Constants	✔				
		1.4 Types of mechanical ventilation		✔			
II	6	**Technical aspects of Mechanical Ventilator** 2.1. Historical Perspective on Ventilator Classification			✔	10	LE, SE
		2.2 Internal Function	✔				
		2.3 Power Source or Input Power	✔				
		2.4 Control Systems and Circuits	✔				

		2.5. Power Transmission and Conversion System	✔				
		2.6 Calibration of specific ventilators	✔				
III	3	**Study of individual ventilators** 3.1 Working principles of adult ventilators: Hamilton Veolar, Amadeus, Galileo		✔		5	LE, SE
		3.2 Working principles of adult ventilators: Datex Engstrom		✔			
		3.2 Working principles of adult ventilators: Drager Evita, Savina		✔			
IV	3	**Assessing and establishing the need for Mechanical Ventilation** 4.1 Respiratory Failure	✔			10	LE, SE
		4.2 Patient History and Diagnosis	✔				
		4.3 Physiological Measurements in Acute Respiratory Failure	✔				
		4.4 Overview of Criteria for Mechanical Ventilation	✔				
		4.5 Possible Alternatives to Invasive Ventilation		✔			
V	3	**Modes of Mechanical Ventilation** 5.1. Modes of Invasive Ventilation	✔			10	LE, SE
		5.2 Modes of Non-invasive ventilation	✔				
		5.3 Dual and hybrid Modes of Ventilation	✔				
VI	6	**Initial Ventilator Settings** 6.1. Determinants during Volume controlled Ventilation	✔			10	LE, SE

		6.2 Special considerations.		✔			
		6.3 Determinants during Pressure controlled Ventilation.	✔				
		6.4 Special considerations.		✔			
		6.5. Setting Baseline Pressure– PEEP.	✔				
		6.6. Determinants during dual controlled and hybrid ventilations.	✔				
		6.7. Selection of other parameters- FiO2, Sensitivity- Pressure and flow, Alarms, Sigh.	✔				
VII	3	**Patient Assessment on Mechanical Ventilation** 7.1 Documentation/Charting		✔		10	LE, SE
		7.2 Initial assessment and serial assessments	✔				
		7.3 Airway Pressure monitoring	✔				
		7.4 Vital Signs, Blood Pressure, and Physical Examination of the Chest	✔				
		7.5 Management of Endotracheal Tube and Tracheostomy Tube Cuffs	✔				
		7.6 Monitoring Compliance and Airway Resistance	✔				
VIII	6	**Assessment of Respiratory Function** 8.1 Noninvasive Measurements of Blood Gases			✔	10	LE, SE
		8.2 Pulse Oximetry	✔				
		8.3 Capnography (Capnometry)	✔				
		8.4 Exhaled Nitric Oxide Monitoring	✔				

		8.5 Transcutaneous Monitoring	✔				
		8.6 Indirect Calorimetry and Metabolic Measurements	✔				
		8.7 Overview of Indirect Calorimetry		✔			
		8.8 Respiratory Mechanics	✔				
IX	2	**Sedatives, Analgesics and Muscle Relaxants** 9.1. Sedatives and Analgesics		✔		5	LE, SE
		9.2 Muscle relaxants		✔			
X	6	**Noninvasive Positive-Pressure Ventilation** 10.1. Types of Noninvasive Ventilation Techniques		✔		10	LE, SE
		10.2. Indications for Noninvasive Positive-Pressure Ventilation	✔				
		10.3. Patient Selection Criteria	✔				
		10.4 Equipment Selection for Noninvasive Ventilation	✔				
		10.5 Selection of Patient Interface	✔				
		10.6 Setup and Preparation for Noninvasive Ventilation	✔				
		10.7 Monitoring and Adjustment of Noninvasive Ventilation	✔				
		10.8 Aerosol Delivery in Noninvasive Ventilation	✔				
		10.9 Complications of Noninvasive Ventilation.		✔			
		10.10 Weaning from and Discontinuing Noninvasive Ventilation	✔				

XI	4	**Ventilator Graphics** 11.1. Relationship of Flow, Pressure, Volume, and Time			✔	10	LE, SE
		11.2. Scalars, Curves, and Loops	✔				
		11.3. Assessment of Pulmonary Mechanics	✔				
		11.4. Assessing Patient-Ventilator Asynchrony	✔				
		11.5 Advanced Applications	✔				

LE: Long Essay, SE: Short Essay

Course Outcome.

By the end of this course students will be able to:

- Understand the basic terminologies and technical concepts of Mechanical Ventilation.
- Differentiate between Volume Ventilation, Pressure Ventilation and other hybrid modes.
- Identify Indications, complications, and physiologic effects of mechanical ventilation.
- Apply appropriate ventilator, initial mode & ventilator parameters
- Understand the concept of Noninvasive Ventilation
- Identify various types of technical and clinical problems encountered during mechanical ventilation of critically ill patients, and describe the steps that can be used to protect a patient when problems occur.
- Identify the normal and abnormal ventilator graphics

Pedagogy:

Theory lectures, demonstrations, assignments, tests, orals, presentations, informal discussions.

Educational Resources

Textbook Required	• Susan Pilbeam and Jim Cairo. Mechanical Ventilation: Physiological and Clinical Application. 6th edition.ISBN-13: 978-0323320092 • Kaczmarek R, et al, eds. Egan's Fundamentals of Respiratory Care, 12th edition. ISBN-13: 978-0323341363. ISBN-10: 0323341365
Supplemental References	• J.M. Cairo. Mosby's Respiratory Care Equipment. 10th Edition ISBN-13: 978-0323416368, ISBN-10: 0323416365 • Martin J Tobin. Principles and practice of mechanical ventilation 3rd edition.

SLEEP MEDICINE AND POLYSOMNOGRAPHY

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

The course provides knowledge on sleep physiology, diagnostic procedure interpretation of diagnostic reports and management of sleep disorders

Course Outline

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	3	**Definition of sleep** 1.1 Historical development of polysomnography			✔	10	LE, SE
		1.2 Clinical assessment of sleepiness	✔				
		1.3 Explain the physiology of the normal sleep cycle.	✔				
		1.4 Explain the control of breathing during sleep	✔				
II	6	**Respiratory system and Neurological system anatomy & physiology** 2.1 Upper and lower airway		✔		15	LE, SE
		2.2 Mechanisms of breathing		✔			
		2.3 Control of breathing		✔			

		2.4 Brain divisions	✔				
		2.5 Brainstem cranial nerves	✔				
		2.6 Peripheral nervous system		✔			
III	6	**Obstructive sleep apnea** 3.1 Epidemiology			✔	10	LE, SE
		3.2 Pathophysiology	✔				
		3.3 Cardiorespiratory changes & symptoms	✔				
		3.4 Clinical evaluation	✔				
		3.5 Risk factors	✔				
		3.6 Pediatric OSA treatment	✔				
		3.7 Effect of COPD on sleep polysomnographic presentation	✔				
IV	6	**Central sleep apnea** 4.1 Definition		✔		10	LE, SE
		4.2 Clinical characteristics and consequences	✔				
		4.3 Pathophysiology	✔				
		4.4 Congestive heart failure		✔			
		4.5 Cheyne-Stokes		✔			
		4.6 Causes of CSA	✔				
		4.7 Treatment	✔				
		4.8 Polysomnographic presentation	✔				
V	6	**Other sleep disorders** 5.1 Cheyne Stokes respiration during sleep	✔			10	LE, SE

		5.2 Upper airway resistance syndrome	✔				
		5.3 Sleep Related Hypoventilation	✔				
		5.4 Sleep Disordered Breathing in Neuromuscular Disease	✔				
		5.5 COPD and Upper Airway Resistance		✔			
VI	6	**Polysomnogram Scoring and Interpretation** 6.1 Sleep stage scoring	✔			15	LE, SE
		6.2 Arousal scoring	✔				
		6.3 Scoring Respiratory Events and Other Sleep Related Abnormalities	✔				
		6.4 Designing a Score sheet	✔				
		6.5 Preparing a Technical Report	✔				
VII	6	**Sleep Apnea and other sleep related breathing disorders** 7.1 Sleep Disordered Breathing Study Parameters	✔			15	LE, SE
		7.2 Obstructive Sleep Apnea and Hypopnea		✔			
		7.3 Upper Airway Resistance Syndrome, Sleep Related Hypoventilation		✔			
		7.4 Cheyne-Stokes Respiration		✔			
		7.5 COPD and Upper Airway Resistance		✔			
		7.6 Central Sleep Apnea and Hypopnea		✔			

		7.7 Repetitive Sleep-Onset Central Apneas	✔				
		7.8 Sleep Disordered Breathing in Neuromuscular Disease		✔			
		7.9 Recognizing Artifacts in Respiratory Channel Tracings	✔				
VIII	6	**Treatment strategies** 8.1 CPAP Study Parameters	✔				
		8.2 Determining Optimal CPAP Levels	✔				
		8.3 Monitoring For Patient Safety and Compliance	✔				
		8.4 Bi-Level Pressure Titration, Adding Supplemental Oxygen	✔				
		8.5 Central Apneas on CPAP	✔			15	LE, SE
		8.6 Mouth Breathing, Residual Snoring and Upper Airway Resistance		✔			
		8.7 Side Effects Associated with CPAP and Bi- Level Pressure Therapy	✔				
		8.8 Hypoxemia and Hypoventilation During CPAP Titration	✔				

LE: Long Essay, SE: Short Essay

Course Outcomes

- Define sleep and the normal phases of sleep
- Explain about different types of sleep disorders
- Exp in about the polysomnography diagnostic procedure
- Interpret the polysomnographic reports and intervene
- Exlplain the management of different sleep disorders

References :

- Badr MS. Essentials of Sleep Medicine. Springer; 2012.
- Berry RB. Fundamentals of Sleep Medicine E-Book. Elsevier Health Sciences; 2011 Aug 2.

- M Kryger, Roth, Dement. Principles and practice of sleep medicine. 6th edition

CRITICAL CARE MEDICINE – I

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

The course will provide the students a basic knowledge on the etiology, clinical presentation, pathophysiology, diagnostic approach and management strategies of underlying disease process

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	3	**Pulmonary disorders and their management** 1.1 Obstructive lung disorders	✔			15	LE, SE
		1.2 Occupational lung disorders	✔				
		1.3 Restrictive lung disorders	✔				
		1.4 Air leak syndromes	✔				
		1.5 Aspiration syndromes	✔				
		1.6 Pulmonary thromboembolism	✔				
		1.7 Pleural effusions,empyema	✔				
		1.8 Pulmonary hypertension	✔				

II	6	**Chest Trauma** 2.1 Birth injuries			✔	10	LE, SE
		2.2 Lung contusions		✔			
		2.3 Penetrating thoracic injuries	✔				
		2.4 Blunt thoracic trauma	✔				
III	6	**Infectious disease and management** 3.1 Tetanus	✔			15	LE, SE
		3.2 Multiorgan failure in ICU	✔				
		3.3 MRSA in ICU	✔				
		3.4 SARS in ICU		✔			
		3.5 Updated Antibiotic therapy and guidelines in ICU	✔				
		3.6 Pulmonary tuberculosis	✔				
		3.7 Hepatitis		✔			
IV	6	**Head Injuries** 4.1 Traumatic head injuries	✔			15	LE, SE
		4.2 Stroke	✔				
		4.3 Brain death evaluation in ICU	✔				
V	6	**Organ failure** 5.1 Acute pancreatitis		✔		15	LE, SE
		5.2 Acute liver failure		✔			
		5.3 Renal failure	✔				
VI	6	**Suicidal and homicidal emergencies** 6.1 Hanging	✔			10	LE, SE

		6.2 Organophosphorous poisoning	✔				
VII	6	**Abdominal Compartmental syndrome**		✔		10	LE, SE
VIII	6	**Animal bites and management** 8.1 Snake bites	✔			10	LE, SE
		8.2 Rabies		✔			

LE: Long Essay, SE: Short Essay

Course Outcome

- List out the causes and clinical features of the various critically ill diseases handles in ICU's
- Explain the pathophysiology of the undelrying clinical condition
- Explain about the diagnostic tools and approaches used for identifying the clinical condition
- Explain in detail about the management strategies and the evidence based practices used in the management of critically ill patients

References:

- Andrew D Bersten, Oh's Intensive Care Manual, 8th edition
- Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. Harrison's principles of internal medicine, 19e. New York, NY, USA:: Mcgraw-hill; 2015.

HEALTHCARE MANAGEMENT

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

CLO 1: Concepts of Hospitals – The student will gain knowledge about hospital administration & planning.

CLO 2: Workflow in hospitals - Enumerate and identify various Clinical Services like OPD, IPD, ward Management, OT, Emergency, disaster Management and ICU.

CLO 3: Organizational Structures - To learn to meet special challenges posed by human

behavior in workplace of 21st century

CLO 4: Quality management - To create an awareness about the process of applying for and implementing various accreditation process in healthcare facilities.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	4	**Hospital Structure** 1.1. Introduction to Hospitals, Healthcare & Medical Care, Rationale of Hospital Administration	✔			5	SE
		1.2 History of Hospitals, Public			✔		

		Health Delivery system in India, Types of Hospitals, Voluntary Health Organizations					
II	8	**Management of Healthcare Organizations** 2.1 Introduction to Management	✔			20	LE, SE
		2.2 Evolution & Theories of Management		✔			
		2.3 Management Functions: Planning	✔				
		2.4 Organizing	✔				
		2.5 Controlling	✔				
		2.6 Decision Making	✔				
		2.7 Staffing	✔				
		2.6 Techniques in Management	✔				
III	7	**Organizational Behavior** 3.1 The Importance of Interpersonal Skills, Scope & Process of OB Structure & theories	✔			15	LE, SE
		3.2 Motivation - Abraham Maslow's hierarchy of needs theory, Theory X & Y. Contemporary theories of motivation	✔				
		3.3 Foundations of Group Behavior – Formal Vs Informal, Social Identity Theory		✔			

		3.4 Organizational Culture		✔			
		3.5 Communications in an Organization	✔				
IV	7	**Management and Health Economics** 4.1 Demand & Supply	✔				
		4.2 Nature of Costs	✔				
		4.3 Marginal cost and breakeven analysis	✔			20	LE, SE
		4.4 Market structure: Business & Government, Role of Government	✔				
V	7	**Accounting for Hospital Management** 5.1 Budgeting & Budgetary control - Classification of budget, P & L, Balance Sheets	✔				
		5.2 Types of Accounts, Debit & Credit	✔			20	LE, SE
		5.3 Financial Statement Analysis	✔				
VI	7	**Concept of Hospital** 6.1 Departmentation in Hospital	✔				
		6.2 Outpatient, Inpatient Services	✔				
		6.3 Intensive Care Unit, Emergency Services	✔			10	SE
		6.4 Laboratory, Radiology	✔				

		6.5 Organizing of support services, Utility Services	✔				
		6.6 Evaluation of Hospital services – Hospital Statistics	✔				
		6.7 Hospital Information Systems - Issues related to Healthcare technology, Planning, Infrastructure	✔				
VII	5	**Evolution of Quality management** 7.1 Quality Management Tools & methods	✔			10	SE
		7.2 Quality certification & Accreditation – NABH, NABL	✔				

LE: Long Essay, SE: Short Essay

Text book/ Reference Books:

1 Prasad LM. Principles and practice of management. Sultan Chand & Sons; 2020 Oct 1

2 Robbins SP, Judge TA, Vohra N. Organizational behaviour by pearson 18e. Pearson Education India; 2019.

3 Sakharkar B. M. Hospital planning & administration. Jaypee Brothers Medical Publishers Pvt. Limited, 2008 Dec 1.

4 Francis CM, De Souza MC. Hospital administration. Jaypee Brothers Medical Publishers; 2000.

5 Kulkarni GR, Satyashanker P, Anil Gomes L. Financial management for hospital administration. Jaypee Brothers Medical Publishers Pvt. Limited, 2009

CLINICAL SKILLS III

Course: Core

Number of Credits: 12 **No of hours:300**

Course Learning Objectives:

This course will provide a practical and demonstrative approach about diagnostic procedures and case study. It comprises of clinical postings and practicum and demonstration classes.

Sl.No.	TOPIC
1.	Practicum & demonstration on Initiation of mechanical ventilation
2.	Practicum & demonstration on maintenance of mechanical ventilator.
3.	Practicum & demonstration monitoring of patient on mechanical ventilator.
4.	Practicum and demonstration on troubleshooting of ventilator graphics
5.	Practicum & demonstration on initiation & weaning of Non-invasive ventilation
6.	Practicum: on modes of ventilation and clinical demonstration
7.	Practicum on acute respiratory failure and the need for ventilatory support.
8.	Practicum on selection of appropriate home care device selection
9.	Practicum and demonstration on polysomnography channels
10.	Practicum & demonstration on sleep study and CPAP titration.
11.	Practicum on sleep related respiratory disorders

Course Outcome:

At the end of the course, the student should be able to know:

- Identify the clinical features and perform the assessments accordingly
- Perform and interpret the diagnostic reports
- Perform evidence-based management strategies for critically ill patients

- Titrate and troubleshoot the ventilator settings as per the clinical condition

SEMESTER IV

MECHANICAL VENTILATION - II

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

This course is designed to build the knowledge for Respiratory Therapy students, about the diagnostic evaluation methods, advanced mode of ventilation and working principle of different mechanical ventilator used in ICU and the troubleshooting of the same.

Course Content

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE %	TYPE OF QUESTIONS
I	4	**Hemodynamic monitoring of the ventilated patient** 1.1 Basic cardiovascular concepts			✔	10	LE, SE
		1.2 Hemodynamic monitoring systems	✔				
		1.3 Pressure monitoring with the pulmonary artery catheter	✔				
		1.4 Catheter complications		✔			

		1.5 Effects of mechanical ventilation on hemodynamic monitoring	✔				
		1.6 Clinical applications	✔				
II	3	**Advanced steps in arterial blood gas evaluation** 2.1 Review of arterial blood gases			✔		
		2.2 Changes in alveolar ventilation with changes in PaO2 and PaCO2	✔				
		2.3 Alveolar ventilation, PaCO2 and VCO2	✔				
		2.4 Changes in PaCO2 affecting PaO2	✔				
		2.5 Changes in pH, PaCO2 and bicarbonate	✔			10	LE, SE
		2.6 Determining acute vs chronic hypercapnia		✔			
		2.7 Changes in pH caused by changes in PaCO2	✔				
		2.8 Changes in plasma bicarbonate caused by changes in PaCO2	✔				
		2.9 Metabolic changes in bicarbonate and pH	✔				
		2.10 Use of Davenport Nomogram		✔			
III	2	**Blood gas analyser** 3.1 Clark, Severinghaus and Sanz electrode - Operating principle		✔		5	LE, SE
		3.2 Blood gas Analyser system		✔			

IV	7	**Newer modes of ventilation** 4.1 Airway pressure release ventilation	✔			15	LE, SE
		4.2 Pressure regulated volume controlled ventilation	✔				
		4.3 Adaptive Support Ventilation	✔				
		4.4 Proportional Assist Ventilation	✔				
		4.5 Neurally Adjusted Ventilator Assist Ventilation	✔				
V	6	**Special issues related to ventilator setup** 5.1 Factors affecting expiratory gas flow	✔			10	LE, SE
		5.2 Periodic hyperinflation or sighing	✔				
		5.3 Sensitivity setting	✔				
		5.4 Selection of fractional inspired O2	✔				
		5.5 Humidification and nebulization	✔				
		5.6 Alarms	✔				
		5.7 Action during ventilator alarm situations	✔				
		5.8 Final considerations in ventilator equipment setup		✔			
		5.9 Selecting the appropriate ventilator	✔				
		5.10 Evaluation of ventilator performance		✔			

		5.10 Initial ventilator settings for specific patient situation	✔				
VI	4	**Disease Specific Ventilation Strategies** 6.1 Chronic Obstructive Pulmonary Diseases, Asthma	✔			10	LE, SE
		6.2 Neuromuscular Disorders, Closed Head Injury	✔				
		6.3 Pneumonia, Acute Respiratory Distress Syndrome, Pulmonary Edema ILD	✔				
VII	2	**Problem solving and troubleshooting** 7.1 Protecting the patient		✔		10	LE, SE
		7.2 Identifying the patient in sudden distress	✔				
		7.3 Patient-related problems	✔				
		7.4 Ventilator-related problems	✔				
		7.5 Common alarm situations	✔				
		7.6 Identification of ventilator problems using graphics	✔				
		7.7 Unexpected ventilator response with new ventilators		✔			
VIII	3	**Home mechanical ventilation** 8.1 Goals of long-term mechanical ventilation		✔		5	LE, SE
		8.2 Patient selection	✔				
		8.3 Equipment selection	✔				
		8.4 Preparation for discharge		✔			
		8.5 Follow up and evaluation		✔			

		8.6 Alternatives to conventional mechanical ventilation at home		✔			
IX	7	**Special techniques in ventilatory support** 9.1 Liquid ventilation of the lung	✔			15	LE, SE
		9.2 Extracorporeal gas exchange techniques	✔				
		9.3 Heliox therapy for severe asthma	✔				
		9.4 Hyperbaric oxygen therapy	✔				
		9.5 High frequency ventilation for adults	✔				
		9.6 Nitric oxide	✔				
		9.7 Tracheal gas insufflation	✔				
X	3	**Recent advances in respiratory care**		✔		5	LE, SE
XI	4	**Specialised cardiopulmonary diagnostics and monitoring** 11.1V/Q scans	✔			5	LE, SE
		11.2 Oxygen consumption		✔			
		11.3 Metabolic assessment		✔			
		11.4 Cardiopulmonary exercise testing	✔				

LE: Long Essay, SE: Short Essay

Course Outcome:

By the end of this course students will be able to:

- Explain in detail about the monitoring systems
- Interpret the blood gas reports and titrate the ventilator settings as per the patient condition
- Working mechanism of ventilator used in Intensive care units
- Explain about the newer mode of ventilation and troubleshooting

- Explain the adjunct diagnostics and ventilator techniques to improve the specific disease process
- Updated about the recent advances in the respiratory care

References

- Pilbeam SP, Cairo JM. Mechanical ventilation: physiological and clinical applications. Mosby; 2006.
- Kacmarek RM, Stoller JK, Heuer A. Egan's fundamentals of respiratory care e-book. Elsevier Health Sciences; 2019 Dec 18.
- Des Jardins T, Burton GG. Clinical Manifestations & Assessment of Respiratory Disease E-Book. Elsevier Health Sciences; 2019 Jan 6

CRITICAL CARE MEDICINE – II

Course: Core

Number of Credits: 3 **No of hours:45**

Course Learning Objectives:

The course will provide the students a basic knowledge on the etiology, clinical presentation, pathophysiology, diagnostic approach and management strategies of underlying disease process

Course Outline

UNIT	NO. OF HOURS	CONTENT	MUST KNOW	GOOD TO KNOW	DESIRABLE TO KNOW	WEIGHTAGE	TYPE OF QUESTIONS

						%	
I	15	**Cardiac disorders** 1.1 ECG - Life-threatening Arrhythmias and treatment	✔			20	LE, SE
		1.2 Acute Myocardial infarction and its ICU management	✔				
		1.3 Unstable angina pectoris		✔			
		1.4 Heart block and ICU management	✔				
		1.5 Cardiac Pacemakers	✔				
		1.6 Coronary Artery Bypass Grafting (CABG)		✔			
		1.7 Aortic valve stenosis and mitral valve stenosis & regurgitation		✔			
		1.8 Infective endocarditis & Pericarditis		✔			
		1.9 Hypertensive crisis	✔				
		1.10 Congestive Heart failure	✔				
		1.11 Pre and Postoperative Management of the Cardiac surgery patients		✔			
		1.12 Cardiac transplantation		✔			
		1.13 Defibrillation			✔		
		1.14 Management of low cardiac output states	✔				
		1.15 Cardiac tamponade		✔			
		1.16 Intra-aortic balloon pump		✔			

		1.17 Ventricular assist device		✔			
II	6	**Disorders affecting the nervous system** 2.1 Neurological examination	✔			15	LE, SE
		2.2 Epilepsy and status epilepticus		✔			
		2.3 Meningitis and ICU management	✔				
		2.4 Viral encephalitis		✔			
		2.5 Hypoxic encephalopathy and coma	✔				
III	6	**Neuromuscular Disorders** 3.1 Gullian barre syndrome	✔			15	LE, SE
		3.2 Myasthenia gravis	✔				
		3.3 Sclerosis and types		✔			
IV	2	**Diaphragmatic Conditions** 4.1 Diaphragmatic dysfunction	✔			10	LE, SE
		4.2 Ventilator induced diaphragmatic dysfunction	✔				
V	5	**Fluid Management** 5.1 Fluid resuscitation	✔			15	LE, SE
		5.2 Electrolyte imbalance	✔				
		5.3 Nutrition in critically ill patients		✔			
VI	6	**Environmental Injuries** 6.1 Thermal injuries	✔			15	LE, SE
		6.2 Smoke inhalation injuries	✔				

		6.3 Drowning and ICU management	✔				
		6.4 Electrical injuries	✔				
		6.5 Hypothermia	✔				
VII	5	**Pregnancy related complications** 7.1 Pre eclampsia and eclampsia	✔			10	LE, SE
		7.2 Amnitoic embolism	✔				
		7.3 HELP syndrome	✔				

LE: Long Essay, SE: Short Essay

Course Outcome

- List out the causes and clinical features of the various critically ill cases handles in ICU's
- Explain the pathophysiology of the underlying clinical condition
- Explain about the diagnostic tools and approaches used for the diagnosis
- Outline the adjunct therapies used for cardiorespiratory management of the patient
- Explain in detail about the management strategies and the evidence-based practices used for the critically ill cases

References:

- Andrew D Bersten, Oh's Intensive Care Manual, 8th edition
- Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. Harrison's principles of internal medicine, 19e. New York, NY, USA:: Mcgraw-hill; 2015.

CLINICAL SKILLS - IV

Course: Core

Number of Credits: 12 **No of hours:300**

Course Learning Objectives:

This course will provide a practical and demonstrative approach about diagnostic procedures and case study. It comprises of clinical postings and practicum and demonstration classes.

Sl.No.	TOPIC
1.	Practicum and demonstration on hemodynamic monitoring
2.	Practicum and demonstration of ABG sampling, analysis and interpretation
3.	Practicum and demonstration on aerosol therapy
4.	Practicum and demonstration of humidification therapy
5.	Practicum and case discussion on ventilatory alarms
6.	Practicum and demonstration on troubleshooting of patient & ventilator events
7.	Practicum on classification of modes & disease specific mechanical ventilation management
8.	Practicum and demonstration about unconventional modes of ventilation including HFOV
9.	Practicum and demonstration of nitric oxide initiation
10.	Practicum on Long term mechanical ventilation
11.	Practicum and demonstration of hyperbaric oxygen therapy

Course Outcome:

At the end of the course, the student should be able to know:

- Identify the clinical features and perform the assessments accordingly
- Perform and interpret the diagnostic reports
- Perform evidence based management strategies for critically ill patients

- Titrate and troubleshoot the ventilator settings as per the clinical condition

Annexures:

Annexure I - Question Paper layout for theory examinations

Annexure II – Logbook template

Annexure III – Journal Club evaluation checklist

Annexure IV – Assignment guideline

Annexure V - Seminar Assessment Rubric Template

Annexure VI – OSPE/OSCE checklist

Annexure VII – Case Presentation