



YENEPOYA

(DEEMED TO BE UNIVERSITY)

Recognized under Sec 3(A) of the UGC Act 1956

Accredited by NAAC with 'A' Grade

YENEPOYA (DEEMED TO BE UNIVERSITY)

Deralakatte, Mangaluru -575018

REGULATIONS AND CURRICULUM GOVERNING

UNDERGRADUATE PROGRAM

B.Sc RESPIRATORY CARE TECHNOLOGY

(REVISED CURRICULUM – AMENDED UP TO 2020)

ATTESTED

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Ref: No. Y/REG/ACA/38-ACM/2020

14.05.2020

NOTIFICATION – 38-ACM/12 /2020 dtd. 14.05.2020

Sub: Revised curriculum of the existing B.Sc. (Tech) programmes and Starting of additional programmes under the Faculty of Allied and Healthcare Professions

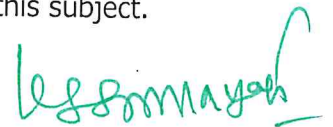
Ref: Resolution of the Academic council at its 38th meeting held on 27.04.2020, vide agenda - 23

The Academic Council at its 38th meeting held on 27.04.2020 and subsequently the Board of Management at its 49th meeting held on 30.04.2020 have resolved to approve the revised curricula and regulations of existing 08 B.Sc. Technology Programmes (Anaesthesia & O.T. Technology, Renal Dialysis Technology, Respiratory Care Technology, Medical Laboratory Technology, Medical Imaging Technology, Cardio Vascular Technology, Perfusion Technology, Optometry Technology) and starting of 04 new programmes under the Faculty of Allied & Healthcare Professions

1. B.Sc. in Physician Assistant
2. B.Sc. in Clinical Psychology
3. B.Sc. in Emergency Medicine Technology
4. B.Sc. in Neuro Science Technology

All these programmes shall follow Choice Based Credit System.

This notification will supersede all the earlier notifications issued on this subject.



REGISTRAR

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CC to:

1. Dean, Faculty of Allied and Healthcare Professions
2. Controller of Examinations
3. File copy

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YENEPOYA (Deemed to be) University
Regulations & programme curriculum for B.Sc. Respiratory Care Technology
Choice Based Credit System.

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. Advanced complex instrumentation & equipment require technologists not only to operate but also to care & maintain these instruments and equipment. These technologists should possess a strong scientific foundation to be able to perform these tasks at a much higher level than the traditionally trained technicians of the past used to perform. The students who are trained in the technological aspects of medical care with a good scientific foundation will be in a position to competently assist the Physician or Surgeon. Hence to prepare the students to meet the demands of the healthcare sector and in accordance with . Ministry of Human Resource Development (HRD), Govt. of India education system, Choice based Credit system is introduced from the academic year 2020- 21 onwards.

A **Respiratory Therapist** is a specialized healthcare professional trained in cardiopulmonary sciences in order to work diagnostically and therapeutically with people suffering from cardiopulmonary and related disorders. Respiratory therapists work in hospitals in the intensive care units (Adult, Pediatric, and Neonatal), on hospital floors, in Emergency Departments, in Pulmonary Functioning laboratories (PFTs), sleep labs, and rehabilitation and home care settings; and are able to perform various non-invasive and invasive procedures.

Choice based Credit System is a flexible system of learning. The distinguishing features of CBCS are following:

- It permits students to learn at their own pace.
- Choose Electives from a wide range of Elective courses offered by the other departments/university.
- Undergo additional courses acquire more than the required number of credits.
- Adopt an Inter-disciplinary and Intra-disciplinary approach in learning.

- Make best use of the available expertise of the faculty across the departments or disciplines.
- Has an inbuilt evaluation system to assess the analytical and creative skills of students in addition to the conventional domain knowledge assessment pattern.

2. Programme Outcome:

PO 1	Upon successful completion of the undergraduate course, students will have developed a broad knowledge in the field of evaluation, diagnosis and management of different conditions of the cardiopulmonary system
PO 2	Ability to function effectively in the health care setting as a member of the healthcare team.
PO 3	Knowledge and application of cardiopulmonary diagnosis and monitoring
PO 4	Knowledge and application of cardiopulmonary pharmacology and pathophysiology
PO 5	Management of respiratory care plans for adult, neonatal and pediatric patients.
PO 6	Demonstrate techniques to maintain the personal hygiene needs of oneself and the patient
PO 7	The ability to communicate effectively in oral, written and visual forms.
PO 8	Ability to stay calm and make the right decisions in adverse conditions.
PO 9	Knowledge of the respiratory care code of ethics and ethical and professional conduct.
PO 10	Knowledge and application of mechanical ventilation and therapeutics.
PO 11	Patient Assessment: General Examination: Vitals, ECG Recording.
PO 12	Ability to perform BLS & ACLS
PO 13	Equipment handling and medication preparation.
PO 14	Analysing and sampling arterial blood gases and Airway management.
PO 15	Ability to treat patients by using a variety of methods, including chest physiotherapy postural drainage and clearance of secretions and aerosol medication such as bronchodilators, mucolytic, mucokinetics.

3. Duration of the Programme:

The duration of the programme shall extend over 8 semesters (three academic years with one year internship) each semester comprising minimum of 15 weeks with the minimum of 90 actual working days of instruction in each semester. The successful completion of the Undergraduate program, along with internship as applicable will lead to Bachelor's degree in Respiratory care Technology (B.Sc. RCT).

4. Semester:

An Academic year shall consist of two semesters.

Odd Semester 1 st , 3 rd , 5 th & 7 th	July/August to December/January
Even semester 2 nd , 4 th , 6 th & 8 th	January/February to June/July

5. Medium of Instructions:

The medium of instruction and examination shall be English.

6. Eligibility for admission:

To be eligible for admission in B. Sc Respiratory Therapy, a candidate should have passed two-years Pre University examination/ Pre Degree examination/ two years after ten years of schooling or its equivalent as recognized by the Yenepoya(Deemed to be) University with Physics, Chemistry and Biology as principal courses of study.

Candidate needs to secure 40% or above marks in the qualifying examination to be eligible for admission. For SC/ST/OBC candidates minimum marks required in the qualifying exam is 35% marks.

7. Semester System and Choice Based Credit System:

The semester system accelerates the teaching-learning process. The credit-based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice-based credit system provides a cafeteria 'type approach in which the students can take courses of their choice, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.

8. Definition of Key words:

- a. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- b. **Choice Based Credit System:** The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).
- c. **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.
- d. **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 15-20week 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.

	Lecture - L	Tutorial - T	Practical - P	Clinical Training/ Rotation CT/CR
1 Credit	1 Hour	1 Hour	2 Hours	3-5 Hours

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

- e. **Grade Point:** It is a numerical weight allotted to each letter grade on a 10-point scale.
- f. **Credit Point:** It is the product of grade point and number of credits for a course.
- g. **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.
- h. **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.
- i. **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.
- j. **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.
- k. **Semester System and Choice Based Credit System:** The semester system accelerates the teaching-learning process. The credit-based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice-based credit system provides a cafeteria 'type approach in which the students can take courses of their choice, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.

9. Types of Courses

Courses in a programme may be of three kinds:

- Core Course
- Ability Enhancement Compulsory Course (Foundation course)
- Elective Course

9.1 Core Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. This is the course which is to be compulsorily studied by a student as a core requirement to complete the program of study in a said discipline.

9.2 Ability Enhancement Compulsory Courses (AECC): Ability enhancement compulsory courses (AECC) are the courses based upon the content that leads to knowledge enhancement.

Example:

1. Environmental science
2. English/ MIL communication

These are mandatory for all disciplines.

9.3. Elective Course (EC)

12.3.1 Generic elective

12.3.2 Skill enhancement course

12.3.3 Self-learning courses (SWAYAM/MOOC)

12.3.4 Discipline Specific Elective courses

9. 3.1 Generic elective: An Elective Course chosen from pool of courses which are unrelated from unrelated discipline/subject with intention to seek exposure beyond disciplines of choice. The purpose of this is to offer the students the option to explore disciplines of interest beyond the choices they make in core and discipline specific elective courses.

9. 3.2: Skill enhancement course: SEC courses are value-based and/or skill- based and are aimed at providing hands-on-training, competencies and skills. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

9. 3.3: Self – learning course: with respect to- UGC (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2021. New Delhi, the 25th March, 2021. Vide No.F.1-100/2016(MOOCs/e-content)

The List of MOOCS (Massive open online courses) and SWAYAM (Study webs of active learning for young aspiring minds) will be finalized by the faculty of allied health professions as per subject to time-to-time UGC notification and will be submitted to the academic council of the DU. Yenepoya (Deemed to be university) shall adopt the regulation of UGC governing MOOCS/ SWAYAM courses as amended from time to time.

The college/ department will designate course coordinator/facilitator to guide the students throughout the course to facilitate the completion of the chosen course.

9.3.3.1 Evaluation and Certification of MOOCs:

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 Yenepoya (Deemed to be) University incorporate the marks/grade obtained by the student, as communicated by the Host Institution through the PI of the SWAYAM course in the marks sheet of the student that counts for final award of the degree by the University.

2. Credit Mobility of MOOCs:

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

In case a student fails to complete the MOOCS course He/ She may be allowed to complete the course requirements by registering for another course online in subsequent semester or opt for a course offered at this Yenepoya (Deemed to be) University.

10. Assigning Credit Hours per Course

While there is flexibility for the departments in allocation of credits to various courses offered, the general formula shall be:

- Every Core course shall be restricted to a maximum of 4 credits.
- The elective course offered by the Yenepoya (Deemed to be) University shall be restricted to a maximum of 2 credits.
- A candidate shall compulsorily complete total Twelve Credits of Elective courses.
- These courses shall be selected either from the Generic Electives, Skill enhancement courses offered by Yenepoya (Deemed to be) university or from the SWAYAM/MOOC/NPTEL courses notified by the UGC time to time and enlisted by the faculty of Allied Health Care Professions. A Candidate shall have freedom to choose the courses of once own choice and at their own pace from the external online platform (SWAYAM/MOOC) or a mix of courses offered by Yenepoya (Deemed to be) University but, require to complete before appearing the Sixth semester end examination.
- A candidate who is desirous to add more credits shall be permitted to do so during the academic duration. Extra credits earned by a candidate shall be included in the marks card on submission of course completion certificate. However, it shall not be considered for awarding the Grade in the UG programme.
- The credits assigned to the course is indicated as L:T:P format. For example, for a 4credit course format could be: 4:0:0 or 1:2:1 or 3:1:0 or 0:0:4etc.

11. Assigning Total Credits for a Programme:

The UGC, in its notification No.F.1-1/2015 (Sec.) dated 10/4/15 has provided a set of “Model curricula and syllabi for CBCS programmes. In conformation with this notification, at Yenepoya (Deemed to be University), for UG programs with duration of 3years study period or 6 semesters, the total credits shall be a maximum of 140 credits and for the UG programme with duration of 4 years study period or 8 semesters, the total credits shall be a maximum of 175credits

12. CBCS Program Coding System

The coding system shall be in the consonance with the system followed by the office of the controller of examination. Presently the following coding pattern is followed.

- First two letters describe the faculty name followed by level of programme (UG – 01; PG – 02) and two letters represent the programme.
- Course code shall have prefix denoting semester number followed by an alphabet of respective type of courses such as C = Core, AECC= Ability Enhancement Compulsory, GE=Generic Elective, SE= Skill Enhancement, SL = Self -Learning, P=Practical followed by numbers denoting number of courses taught-

1st SEM: 1C1, 1C2, 1C3,1C4, 1AECC1, 1AECC2, GE1/SE1/SL1 etc.

2nd SEM: 2C1, 2C2, 2C3,2C4, 2AECC1, 2AECC2,2AECC3,2AECC4, GE2/SE2/SL2 etc.

3rd SEM: 3C1, 3C2, 3C3,3C4, 3AECC1, GE3/SE3/SL3, 3P1, etc.

4th SEM: 4C1, 4C2, 4C3, 4C4,4P1,4AECC1,4AECC2, GE4/SE4/SL4etc.

5th SEM: 5C1, 5C2, 5C3,5GE1/5SE1, 5P1,GE5/SE5/SL5etc.

6th SEM:6C1, 6C2, 6C3,6GE1/6SE1, 6P1, GE6/SE6/SL6etc.

7th SEM:7C1

8th SEM:8C1

13.Attendance:

13.1 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.

13.2 There shall be no provision for condemnation of shortage of attendance.

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

13.4 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.

14 .Scheme of examination.

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

14.2 The components of CIA (Continuous Internal Assessment) may include 2 internal assessment tests, assignments and assessment of conduct/discipline.

14.3 The marks for CIA shall be 40% and SEE shall be 60%.

14.4 There shall be no minimum marks for CIA for a pass, but the minimum marks for pass per course shall be 50% CIA and SEE together.

14.5 There shall be examinations at the end of each semester ordinarily during December/January for odd(1st & 3rd) semesters and during June/July for even(2nd & 4th) semesters. The SEE for 5th & 6th Semester will be held during December/ Jan and June/ July of each year

14.6 The SEE duration shall be three hours.

14.7 The question paper pattern shall be decided by the Board of Studies (BOS) of the respective departments.

Internal assessment format per course (distribution of marks)

Internal Assessment Components	Maximum Marks
Two IA tests	20
Assignment	10
Conduct/discipline	10
Total Marks	40

First Internal Assessment shall be held in the 6th week of the semester and the second internal examination will be held one month before the semester end university examination.

Question Paper Pattern for core course SEE

SUBJECTS HAVING MAXIMUM MARKS = 60					Duration
Type of question	Number of questions	To be Answered	Marks for each question	Total	
LONG ESSAY TYPE	02	01	10	10	180 minutes
SHORT ESSAY TYPE	10	08	05	40	
SHORT ANSWERS	07	05	02	10	
Total				60	

Question Paper Pattern for AECC SEE

SUBJECTS HAVING MAXIMUM MARKS = 40					Duration
Type of question	Number of questions	To be Answered	Marks for each question	Total	
LONG ESSAY TYPE	02	01	10	10	90 minutes
SHORT ESSAY TYPE	05	03	05	15	
SHORT ANSWERS	07	05	03	15	
Total				40	

Practical examination

SLNO	Components	Marks
1	Spotters	20
2	Case scenario/Stations	20
3	Viva Voice	20
Total Marks		60

PARTICULARS OF PRACTICAL, VIVA-VOCE

- Practical examination will be aimed at examination of clinical skills and competence of the candidates for undertaking independent work as a specialist.
- Viva- Voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence & oral communication skills.
- OSCE/OSPE- shall have minimum of 4 stations.

15.Evaluation of Answer Scripts

- Each theory examination shall have single evaluation. There shall be provision for re-evaluation on a payment of a fee. An external examiner shall value the paper, if the difference is more than 15% of previous marks the answer script shall be sent for third evaluation. In such an event, the average of the best two out of the three scores will be taken as the final score.
- Practical examination shall be jointly conducted and evaluated by one internal examiner and one external examiner.

16.Classification of Successful candidates:

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 six semesters and the corresponding overall alpha sign grade.

16.1 Letter Grades and Grade Points:

16.1.1 The Deemed to be University would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.

16.1.2 The UGC recommended 10-point grading system with the following letter grades are given below:

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B(Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)/ RA (Reappear)	0
Ab (Absent)	0
Not Eligible (NC) detained	0

16.1.3 A student obtaining Grade RA/ Ab shall be considered failed and will be required to reappear in the end semester examination.

16.2 The Semester Grade Point Average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester.

For example, if a student takes five (Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student's grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students' SGPA is equal to:

$$\text{SGPA} = \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a student has a F or ABS grade in program 4, the SGPA shall then be computed as:

$$\text{SGPA} = \frac{C1G1 + C2G2 + C3G3 + C4* \text{ZERO} + C5G5}{C1 + C2 + C3 + C4 + C5}$$

16.3 Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VI semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VI semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the program(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C1S1 + C2S2 + C3S3 + C4S4 + C5S5 + C6S6}{C1 + C2 + C3 + C4 + C5 + C6}$$

where C1, C2, C3,.... is the total number of credits for semester I,II,III,.... and S1, S2, S3....is the SGPA of semester I,II,III,....

Calculation of GPA & CGPA: An example (1st semester)

Progr am Code	Course	Credits (a)	Grade Obtained	Credit Value (b)	Grade Points (axb)
	Course 1	4	B	8	32
	Course 2	4	B	8	32
	Course 3	4	O	10	40
	Course 4	2	C	7	14
	Course 5	2	A	9	18
	Total	16	-	-	136

1st Semester GPA = Total Grade Points / Total Credits = 136 / 16 = 8.5 2nd Semester

GPA = 7 with respect to 18 Credits

Then 1st Year CGPA = $(8.5 \times 16) + (7 \times 18) / 16 + 18 = 7.7$

17. Declaration of Class

The class shall be awarded on the basis of Cumulative marks scored in all the Courses

First Class with Distinction = Aggregate Marks 75% and above

First Class = Aggregate Marks 60 to 74.9%

Second Class = Aggregate Marks 50 to 59.9%

17.1 Promotion Criteria

- The students are allowed to carry over any number of courses till sixth semester. But student is eligible to appear for the End semester exam of sixth semester if he/she has cleared all the Courses both Core and AECC of first, second, third & fourth semesters. If student has any pending course of first to fourth semesters, he/she is not eligible to appear for the end semester exam of the sixth semester. However, Fifth semester courses are allowed to club with sixth semester end examination. But, all the Core courses and AECC Courses of first to fourth semester should be completed to be eligible for 6th end semester exam.
- Candidate should also complete 12 credits of elective course to be eligible for the 6th (in case of 3year program) end Semester Examination.
- Candidate should clear all Courses (Core, AECC & Elective courses) of all the semester, to be eligible to start the one year of mandatory internship.
- A failure in any one Course will mean the candidate has to reappear for the exam in that Course only.
- A candidate who passes the semester examinations in parts is eligible for only CGPA and letter grade but not for Class/ ranking/award/medal from the University.

18. Internship

A candidate has to mandatorily complete 1 year (2 semesters) of internship. The total credits per semester is 18 and for two semesters it is 36.

The internship time period provides the candidate the opportunity to develop confidence and increased skill in simulation and treatment delivery. Candidate will demonstrate competence in basic and intermediate procedures and will observe the advanced and specialized treatment procedures. The candidate will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The candidate is expected to work for minimum 8 hours per day and this may be more depending on the need and the healthcare setting.

18.1 Eligibility

A candidate should have passed in all the courses (Core, AECC, and Electives) amounting to 139 number of credits before entering in to internship.

19. Eligibility for the award of Degree

A candidate shall have passed in all the Courses of all six semesters and should have successfully completed one year of mandatory internship (02 semesters) as required for the programme.

20. Maximum Period for Completion of Programme:

A candidate shall complete Six semesters (Three Years) programme within Six years from the date of admission. Hence, the maximum period for completion of the programme is seven years.

21. Minimum for a pass:

21.1 A candidate shall be declared to have passed the UG programme if he/she secures at least CGPA of 4.0 (Course Alpha-Sign Grade P) in the aggregate of both internal assessment and semester end examination marks.

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

21.3 The results of the candidates who have passed the sixth 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.

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

21.5 There shall be no minimum in respect of internal assessment and viva-voce marks.

22. Re-Entry after Break of the study:

22.1 Candidates admitted to a program abstaining for more than 3 months must seek readmission into the appropriate semester.

22.2 The candidate shall follow the syllabus in vogue (currently approved/is being followed) for the program.

22.3 All re-admissions of candidates are subject to the approval of the University

23. Program Structure

Semester I

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per week			Credits
			IA	SEE		L	T	P	
1	Core	Anatomy	40	60	100	4	-	-	4
2	Core	Physiology	40	60	100	4	-	-	4
3	Core	Biochemistry	40	60	100	4	-	-	4
4	Core	Introduction to Respiratory Profession	40	60	100	2	-	-	2
5	AECC	English & Communication	10	40	50	2	-	-	2
6	AECC	Constitution of India	10	40	50	2	-	-	2
Total					500				18

Note: Of the total available 36 hours per week for teaching learning processes, 18 hours per week is dedicated to Core and AECC courses. Remaining Hours are available for Electives/Value added courses/Extracurricular activities etc.

Semester II

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per week			Credits
			IA	SEE		L	T	P	
1	Core	General pathology	40	60	100	4	-	-	4
2	Core	Microbiology	40	60	100	4	-	-	4
3	Core	Introduction to Respiratory Therapy Equipment	40	60	100	2	-	-	2
4	Core	Cardiopulmonary Applied Anatomy & Physiology	40	60	100	2	-	-	2
5	AECC	Environmental Studies	10	40	50	2	-	-	2
5	AECC	Health Care	10	40	50	2	-	-	2
6	AECC	Medical Ethics	10	40	50	1	-	-	1
7	AECC	Sociology	10	40	50	1	-	-	1
Total					600				18

Note: Of the total available 36 hours per week for teaching learning processes, 18 hours per week is dedicated to Core and AECC courses. Remaining Hours are available for Electives/Value added courses/Extracurricular activities etc.

Semester III

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per week			Credits
			IA	SEE		L	T	P	
1	Core	General Pharmacology	40	60	100	4	-	-	4
2	Core	Respiratory Therapy science I	40	60	100	2	-	2	3
3	Core	Patient Assessment & Diagnostics	40	60	100	3	-	2	4
4	Core	Cardiopulmonary Disease I	40	60	100	2	-	-	2
5	Core	Clinical Training-I	40	60	100	-	-	18	4
6	AECC	Kannada	10	40	50	2	-	-	2
Total					550				19

Note: Of the total available 36 hours per week for teaching learning processes, 33 hours per week is dedicated to Core and AECC courses. Remaining Hours are available for Electives/Value added courses/Extracurricular activities etc.

Semester IV

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per week			Credits
			IA	SEE		L	T	P	
1	Core	Cardiopulmonary Pharmacology	40	60	100	2	-	-	2
2	Core	Respiratory Therapy Science II	40	60	100	2	-	2	3
3	Core	Cardiopulmonary Disease II	40	60	100	2	-	-	2
4	Core	Mechanical Ventilation I	40	60	100	2	-	2	3
5	Core	Clinical Training-II	40	60	100	-	-	18	4
6	AECC	Human Rights and Gender Equity	10	40	50	2	-	-	2
7	AECC	Biostatistics	10	40	50	2	-	-	2
Total					600				18

Note: Of the total available 36 hours per week for teaching learning processes, 34 hours per week is dedicated to Core and AECC courses. Remaining Hours are available for Electives/Value added courses/Extracurricular activities etc.

Semester V

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per week			Credits
			IA	SEE		L	T	P	
1	Core	Pulmonary Function Tests and Imaging	40	60	100	3		2	4
2	Core	Mechanical Ventilation II	40	60	100	3	-	2	4
3	Core	Essentials of Critical Care	40	60	100	3	-	-	3
4	Core	Clinical Training III	40	60	100		-	18	4
Total					400				15

Note: Of the total available 36 hours per week for teaching learning processes, 31 hours per week is dedicated to Core and AECC courses. Remaining Hours are available for Electives/Value added courses/Extracurricular activities etc.

Semester VI

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per week			Credits
			IA	SEE		L	T	P	
1	Core	Neonatal and Pediatric Respiratory Care	40	60	100	3	-	2	4
2	Core	Cardiopulmonary Rehabilitation and Home Care	40	60	100	3	-	2	4
3	Core	Sleep Medicine and Polysomnography	40	60	100	3	-	2	4
4	Core	Clinical Training IV	40	60	100		-	18	4
Total					300				16

Note: Of the total available 36 hours per week for teaching learning processes, 33 hours per week is dedicated to Core and AECC courses. Remaining Hours are available for Electives/Value added courses/Extracurricular activities etc.

Semester VII

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per day			Credits
			IA	SEE		L	T	P	
1	Core	Internship I	40	60	100	-	-	8	1
Total					100				18

Semester VIII

Sl. No	Category	Course Name	Max Marks		Total Marks	Hours Per day			Credits
			IA	SEE		L	T	P	
1	Core	Internship II	40	60	100	-	-	8	1
Total					100				18

Total credit	104
Elective	12
Internship	36
Total Credit of the program	152

SEMESTER-1

ANATOMY

Course: Core

Credits: 04

Number of hours: 60 hours

Course objectives:

- Identify and locate each of the body systems to apply anatomical knowledge to perform minor technical procedural skills.
- Know the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures.
- Describe the functions of each body system
- Discuss the interrelationship of systems in maintaining homeostasis.
- Know the anatomical basis of disease and injury.

Course Content:

Unit I: Introduction: Human body as a whole

2 Hours

- Definition of anatomy and its divisions. Terms of location, positions and planes. Cell and its organelles.
- Epithelium: definition, classification, describe with examples, function. Glands: classification, describe serous & mucous glands with examples. Basic tissues: classification with examples.
- Demonstration: Histology of types of epithelium. Histology of serous, mucous & mixed salivary gland.

Unit II: Locomotion and support

12 hours

Bone: classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, inter-vertebral disc, fontanelles of fetal skull.

Joints: classification of joints with examples, synovial joint (in detail for radiology).
Muscular system: classification of muscular tissue & histology, names of muscles of the body.

Demonstration: Bones & joints. Histology of compact bone (TS & LS). Demonstration of all muscles of the body. Histology of skeletal, smooth & cardiac muscle (TS & LS). Histology of the 3 types of cartilage. Demo of all bones showing parts, radiographs of normal.

Unit III: Cardiovascular system

8 hours

Heart: size, location, chambers, exterior & interior, blood supply of heart. Systemic & pulmonary circulation, branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery, peripheral pulse, inferior vena cava, portal vein, Porto-systemic anastomosis, great saphenous vein, Dural venous sinuses. Lymphatic system: cisterna chyli & thoracic duct, histology of lymphatic tissues, names of regional lymphatics, axillary and inguinal lymph nodes in brief

Demonstration of heart and vessels in the body. Histology of large artery, medium sized artery & vein, large vein. Histology of lymph node, spleen, tonsil & thymus. Normal chest radiograph showing heart shadows. Normal angiograms

Unit IV: Gastro-intestinal system

8 hours

Parts of GIT, oral cavity, lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring, oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas, radiographs of abdomen

Demonstration of parts of gastro intestinal system. Normal radiographs of gastro intestinal system. Histology of gastro intestinal system.

Unit V: Respiratory system

4 hours

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, broncho-pulmonary segments, histology of trachea, lung and pleura, names of paranasal air sinuses.

Demonstration of parts of respiratory System Normal radiographs of chest. -Histology of lung and trachea

1. Peritoneum

1 hour

Description in brief . Demonstration of reflections.

2. Urinary system

2 hours

Kidney, ureter, urinary bladder, male and female urethra. Histology of kidney, ureter and urinary bladder

Demonstration of parts of urinary system. Histology of kidney, ureter, urinary bladder. Radiographs of abdomen-IVP, retrograde cystogram.

3. Reproductive system

2 hours

Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology). Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology). Mammary gland: gross

Demonstration of section of male and female pelvis with organs in situ. Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tube, ovary. Radiographs of pelvis, hysterosalpingogram.

4. Endocrine glands

2 hours

Endocrine glands: pituitary gland, thyroid gland, parathyroid gland, suprarenal gland (Gross & Histology).

Demonstration of the glands. Histology of pituitary, thyroid, parathyroid, suprarenal glands.

5. Nervous system

12 hours

Neuron, classification of nervous system, cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology), meninges, ventricles & cerebrospinal fluid, names of basal nuclei, blood supply of brain, cranial nerves. Sympathetic trunk & names of parasympathetic ganglia

Histology of peripheral nerve & optic nerve. Demonstration of all plexuses and nerves in the body. Demonstration of all parts of brain. Histology of cerebrum, cerebellum, spinal cord.

6. Sensory organs

3 hours

Skin: histology, appendages of skin. Eye: parts of eye & lacrimal apparatus. Extra-ocular muscles & nerve supply. Parts of ear: external, middle and inner ear and contents.

Histology of thin and thick skin. Demonstration and histology of eyeball. Histology of cornea & retina.

7. Embryology

4 hours

Spermatogenesis & oogenesis. Ovulation, fertilization. Fetal circulation. Placenta, Demonstration of models.

Recommended Books

- Chaurasia BD. Human anatomy. CBS Publisher; 2004.
- Priya Ranganath. Text book of Anatomy for Allied Health Sciences New Delhi: CBS publishers and distributors.
- Waugh A, Grant A. Ross & Wilson Anatomy and physiology in health and illness E-book. Elsevier Health Sciences; 2014 Jun 25.
- Dilly PN. Essentials of Human Embryology. Postgraduate Medical Journal. 1984 Jun;60(704):447.
- Inderbir S. Textbook of human histology with color atlas. New Delhi: Jaypee Brothers Medical Publishers. 2006.

PHYSIOLOGY

Course: Core

Credit:04

Theory Classes:60 Hours

Course objectives:

- To broadly understand the physiological structure of each organ system and its physiological functions.
- To understand broadly the clinical abnormalities of organs and its clinical physiological implications.

COURSE CONTENT:

1. General Physiology

2 hours

Introduction to physiology

Homeostasis: Definition, Positive feedback, negative feedback.

Body Fluid Compartments *Transport mechanisms (brief)*

1. Blood

7 hours

Introduction : composition and function of blood.

Blood Cells: types, Normal Count, Red blood cells: function. Erythropoiesis: Definition, Stages, Factors affecting, Hemoglobin: Function, concentration Physiological variation of RBC Count and Hb *Structure of Hb, methods of estimation*

White blood cells: different types, functions, normal count, differential count *Immunity(brief)*

Platelets: origin, normal count, functions *Morphology*

Hemostasis: definition, steps, clotting factors, mechanism of clotting, disorders of clotting,

Blood groups: ABO system, Rh system: Rh factor, Rh incompatibility. Blood grouping & typing, cross matching. Blood transfusion: indication, universal donor and recipient concept. Selection criteria of a blood donor, transfusion reactions. *Anticoagulants: classification, examples and uses*

Anemias: definition, Symptoms and signs (brief). Blood indices: color index, MCH, MCV, MCHC (def and Normal Values). ESR and PCV: Normal values, definition, determination (methods).

Morphological and etiological classification of Anemia Plasma proteins: types and concentration, functions of albumin, globulin, fibrinogen, prothrombin. Blood volume:

normal value, determination of blood volume *Regulation of blood volume (brief), Functions of Lymph*

2. Muscle Nerve physiology

5 hours

Introduction, Classification and structure of muscle, sarcomere *contractile proteins*
Neuromuscular junction, Transmission across neuromuscular junction .Excitation contraction coupling. Mechanism of muscle contraction, rigor mortis .*Fatigue*

3. Cardiovascular system

8 hours

Heart: physiological anatomy, nerve supply. Properties of cardiac muscle Cardiac cycle: definition, systole, diastole, phases, JVP (brief) Cardiac output, stroke volume, EDV (only definitions).Heart sounds, normal heart sounds, mechanism and features, areas of auscultation.

Intra-ventricular pressure curves, Significance of Heart sounds

Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension Heart rate: Physiological variations, regulation (brief), radial pulse, Electrocardiogram (ECG): Definition, Normal ECG, Causes of ECG waves, Uses of ECG. Cardiac shock: Definition, Types (brief), Triple response.

4. Respiratory system

6 hours

Introduction: Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract Respiratory organs: lungs, alveoli, respiratory membrane Mechanism of breathing: Inspiration and Expiration, muscles involved, Mechanism.

Surfactant: Composition, Function, *intra pulmonary pleural pressure, surface tension*

Transport of oxygen: forms of transport, Oxygen Hemoglobin Curve. Lung volumes and capacities: Spirogram, Definitions and normal Volumes. Regulation of respiration: Nervous and chemical regulation, respiratory Centre, Herring Breur reflexes. Hypoxia: Definition, Classification, Description (in brief). Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnoea. (Definition Only)

5. Digestive System

5 hours

Introduction Physiological anatomy of gastro intestinal tract (All Structures in brief), functions of digestive system. Functions of Saliva Deglutition: definition, stages

Stomach: functions Gastric secretion: composition, function, Phases of secretion

Pancreas: Functions (exocrine), pancreatic juice: composition and regulation. Secretin and CCK-PZ

Liver: Functions, Bile secretion, composition, function of bile; Bilirubin metabolism, types of bilirubin, Vandenberg reaction, Jaundice: types, significance. Gall bladder: Functions.

Small intestine: functions, digestion and absorption, movements. (brief) Large intestine: functions, defecation reflex

6. Renal System

5 hours

Introduction: Functions of kidneys, composition of urine, nephron, cortical and juxtamedullary nephrons (comparison), Juxta Glomerular Apparatus: structure and function. *Vasa recta*

Mechanism of urine formation GFR: Definition, Normal Values, factors effecting GFR, Measurement (Creatine, Inulin Clearance). Tubular reabsorption, TMG, Tubular secretion (brief).

Mechanism of urine concentration: Counter-current mechanisms, Role of AD *Diuresis*, *Diuretics*. Micturition, innervation of bladder, cystometrogram.

7. Skin and Body temperature

1 hour

Structure and function of Skin *Sweat Glands* Body Temperature: physiological variation. Regulatory mechanisms: Mechanisms Activated by Heat/Cold Role of hypothalamus, and fever.

Body temperature measurement, hypothermia

8. Endocrine System

5 hours

Introduction: Definition, classification of endocrine glands & their hormones.

Hypothalamic- pituitary Axis Pituitary hormones: anterior and posterior pituitary hormones, Functions of Growth hormone,

Thyroid gland: Thyroid Hormones: physiological function, regulation of secretion, disorders: hypo and hyper secretion of hormone. *Physiological anatomy of Thyroid*

Adrenal cortex: functions of Cortisol and Aldosterone Adrenal medulla: functions of Adrenaline and Nor-adrenaline *.Physiological anatomy of Adrenal*

Pancreas (Endocrine): Hormones of pancreas. Insulin: functions, regulation of blood glucose level, Diabetes mellitus *Abnormalities of pancreatic hormones(brief)* Regulation of Calcium Metabolism: Hormones involved, actions of PTH, Calcitonin, Vit D3 *Tetany*

9. Reproductive system

4 hours

Introduction, Function of reproductive system, Changes during puberty.

Sex Differentiation

Male reproductive system: functions of testes Spermatogenesis: Definition, site, stages, factors influencing, Endocrine functions of testes *Sperm, semen*. Androgens: testosterone functions.

Female reproductive system, Menstrual cycle: Definition, changes, ovulation Functions of progesterone and estrogen *Hormonal Regulation* Physiological changes during pregnancy, Lactation(brief), milk ejection reflex

10. Nervous system

8 hours

Introduction: Parts of CNS and PNS, Functions of nervous system

Neuron: definition, structure Nerve Fiber: classification, conduction of impulses continuous and saltatory. *Neuroglia*

Synapse: Definition, structure, types, properties (brief). Receptors: definition, classification, properties (brief). Reflex: Definition, Reflex Arc, Examples.

Babinski's sign. Tone, Posture(definition), Spinal cord nerve tracts: Diagram and Functions: Lateral Spino Thalamic Tract, Dorsal Column, Pyramidal Tract *.UMN and LMN lesion, Hemiplegia, Stroke (brief)* Functions of: Cerebral cortex, Cerebellum, Hypothalamus, Basal Ganglia *EEG, Parkinsonism*

Cerebro- Spinal Fluid (CSF): site of formation, circulation (brief), functions. *Lumbar puncture*. Autonomic Nervous System: Sympathetic and parasympathetic distribution and functions (brief).

11. Special senses

4 hours

Vision: Functions of different parts (brief) Optic Pathway, Dark Adaptation, Color vision. *Structure of eye, Structure of retina*.

Hearing: Function of Middle Ear, Functions of inner ear, mechanism of hearing (brief).

Chemical Senses: Taste: types, receptor, Smell: physiology, receptors.

Recommended Books

1. Guyton (Arthur): Text Book of Physiology. Latest Ed. Prism publishers.
2. Ganong William F: Review of Medical Physiology. Latest Ed. Tata McGraw Hill
3. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency. Choudhary Sujith K: Concise Medical Physiology Latest Ed. New Central Book.

BIOCHEMISTRY

Course: Core

Theory classes: 60 hours

Core : 4

Course Objectives:

- Understanding the basic principles and procedures in specimen collection, reagent preparation and testing in Clinical laboratory
- Understanding the properties of biomolecules, their function and biochemical process involved in health and disease.
- Understanding the importance of nutrition in health and disease

COURSE CONTENT:

1. Introduction and scope of Biochemistry **2 hours**

2. Specimen collection: **4 hours**

Pre-analytical variables. Collection of blood. Collection of CSF & other fluids. Urine collection. Use of preservatives. Anticoagulants.

3. Safety measurements, Conventional and SI units **2 hours**

4. Dilutions **2 hours**

Diluting solutions: e.g. preparation of 0.1 N NaCl from 1 N NaCl & from 2N NaCl etc., preparing working standard from stock standard, body fluid dilutions, reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc., saturated and supersaturated solutions.

5. Carbohydrate chemistry **4 hours**

Classification, Isomerism, General reactions of carbohydrates

6. Lipids **4 hours**

Chemistry of fatty acids, triglycerides, cholesterol, phospholipids, lipoproteins, Classification and functions.

7. Protein chemistry, structure **4 hours**

8. Plasma Proteins **2 hours**

Concentration, biochemical changes in disease, interpretation

9. Enzymes **6 hours**

Definition, classification, coenzymes, cofactors, factors effecting enzyme activity, inhibitors, units of measurements, isoenzymes, biological interpretation

10. Vitamins **6 hours**

Definition, classification, sources, functions, deficiency disorders

11. Minerals **6 hours**

Na, K, Ca, P, Fe, Cu, selenium- sources, daily requirements, availability and properties

12. Nutrition **3 hours**

Calorific value, nitrogen balance, respiratory quotient, basal metabolic rate, dietary fibers, nutritional importance of lipids, carbohydrates and proteins, vitamins. Nutrition, nutritional support with special emphasis on parental nutrition.

13. Quality control **2 hours**

Accuracy, precision. Specificity, sensitivity, limits of error allowable in laboratory, percentage error. Normal values and Interpretations.

14. Special Investigations **11 hours**

Serum electrophoresis, immunoglobulin's, drugs: digitoxin, theophylline's, regulation of acid base status, Henderson Hassel Bach equations, buffers of the fluid, pH regulation, disturbance in acid base balance, anion gap, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of blood gases and pH, basic principles and estimation of electrolytes, water balance, sodium regulation, bicarbonate buffers,

15. Bio Medical waste management **2 hours**

Course outcome

At the end of the course students must demonstrate an understanding of

- Various biomolecules in our body and their classification
- Sample collection for various tests performed in laboratory
- Preparation of dilutions of chemicals and body fluids.
- Various terms used in quality control
- Biomedical wastes management
- Significance of various special investigations

Recommended Books :

1. Varley H. Practical clinical biochemistry. Practical clinical biochemistry. 1954.
2. Naithani M, Singh P. Teitz textbook of clinical chemistry & molecular diagnostics. Medical Journal, Armed Forces India. 2006 Apr;62(2):204.
3. Kaplan LA, Pesce AJ, Kazmierczak SC. Clinical chemistry. Theory, analysis, correlation. 2003.
4. Ramakrishna(S) Prasanna(KG), Rajna ® Text book of Medical Biochemistry Latest Ed Orient Longman Bombay –1980
5. Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students ,Latest Ed

INTRODUCTION TO RESPIRATORY THERAPY PROFESSION

Total Hours: 30

CORE: COURSE

Credit: 02

Course Objective 'Introduction to Respiratory Therapy Profession' provides an overview of the history and development of Respiratory Therapy profession. The course is designed to explain the role and scope of respiratory therapy profession and describes the academic and Career Perspectives in Respiratory therapy. This course emphasizes on the standards of professional and clinical practices that a Respiratory Therapist should follow in an actual hospital setting. The course provides an introduction of various clinical domains and equipment used in Respiratory Therapy.

Course Outline

Topic

1. Respiratory Care as a profession

- 1.1 History and development of Respiratory Therapy profession
- 1.2 Professional Organizations and events
- 1.3 Respiratory Therapy education

2. Role and Scope of Respiratory Therapist in the Health Care Sector

3. Academic and Career Perspectives in Respiratory Therapy

- 3.1 Academic Perspectives- Masters, Doctorate, Post-Doctoral Fellowships in Respiratory Care and Allied Fields; Higher Certification in advanced and related areas like Emergency Medical Care and Extra corporeal Life Support Therapy
- 3.2 Clinical Professionals
- 3.3 Academic Professionals
- 3.4 Research Professionals
- 3.5 Corporate Professionals

- 4. Standards of Professional Practice**
 - 4.1 Competencies
 - 4.2 Scope of Practice- Diagnostics and Therapeutics
 - 4.3 Standards of practice
 - 4.4 Evidence-Based Respiratory Therapy
 - 4.5 Research in Respiratory Therapy
 - 4.6 Elements of hospital based Respiratory Therapy
 - 4.7 Critical thinking in Respiratory Therapy
 - 4.8 Professional Hierarchy in Respiratory Therapy Profession
- 5. Ethical and Legal Implications of Practice-**
 - 5.1 Codes of Ethics, Ethical Theories and principles & Legal issues related to Respiratory Therapy Profession
- 6. Communication in Health care**
 - 6.1 Communication skills
 - 6.2 Conflict and conflict resolution
 - 6.3 Interpersonal and inter-professional relationship.
- 7. Standards of Clinical Practice**
 - 7.1 Clinical Assessment and Management
 - 7.2 Health promotion and Education
 - 7.3 Principles of Infection Prevention and Control
 - 7.4 Infection prevention strategies Hand washing steps and significance
Isolation Procedures

Course Outcome:

- Explain the history of respiratory care and its professional organizations.
- Understand the role and scope of the respiratory therapist in the health care sector
- Understand the Academic and Career Perspectives in Respiratory Therapy
- Understand and explain the standards of professional practice.
- Recognize the ethical and legal aspects implied in respiratory care profession
- Understand the importance of developing communication skills and the need for maintaining interpersonal and inter professional relationships.
- Discuss the standards of clinical practice including health

promotion and infection control practices.

- Understand the importance of various clinical domains and practice in Respiratory Therapy.

Recommended books :

- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book

ENGLISH AND COMMUNICATION

Course: AECC

Credit: 02

Number of hours 30 hours

Course Objectives

The course is designed to enable students to enhance their ability to speak and write English required for effective communication in their professional work. Students will practice their skills in verbal and written English during clinical and classroom experience.

Unit 1:PHONETICS

- Brief introduction to the history of English Language & Phonetics **(4 Hours)**
- Vowels, Diphthongs, Consonants
- Native pronunciation of English words

Unit – 2: Difference between American & British English (2 Hours)

- Difference with regards to the Vocabulary, Accent, Grammar & Spellings.
- Syllables & Word Stress

Unit– 3: Grammatical Skills (10 hours)

- Verb Tenses
- Appropriate Use of Prepositions
- Articles
- Subject Verb Agreement
- Appropriate usage of Punctuation and Capitalization
- Modals
- Transformation of Sentence structures
- Active Passive Voice
- Reporting skills
- Question Tags
- Homonyms & Homophones
- Degrees of Comparison
- One-word Substitution
- Linkers

Unit – 4: Written Communication Skills**(5 Hours)**

- Drafting of formal letters
- Email drafts – Do's and don'ts in professional emails.
- Article and Essay writing
- Notice writing
- Speech writing
- News Report writing
- Dialogue writing

Unit 5: Oral Communication Skills**(6 Hours)**

- Way of Communicating when we meet people. Face to Face Communication
Tone of voice Body Language
- Small Talk
- Elevator Speech
- Etiquettes of Phone Conversation & Phone role play
- Basics of meeting online
- Video conference role play
- Group discussion
- First Impressions
- Interview Skills: Purpose of an Interview
Do's & Don'ts of an Interview

Unit 6: Presentation Skills**(3 Hours)**

- Debating
- Speech Relay
- Presentations

Course Outcomes

- Apply the concepts and principles of English Language use in professional development such as pronunciation, vocabulary, grammar, paraphrasing, voice modulation, Spelling, pause and silence.
- Apply LSRW (Listening, Speaking, Reading and Writing) Skill in combination to learn, teach, educate and share information, ideas and results.

Recommended Books:

- Raymond Murphy. English Grammar in Use. Cambridge University. 2012.
- David Green. Contemporary English Grammar Structures and Composition. Macmillan Publishers. 2015.

CONSTITUTION OF INDIA

Course: Core

Credits: 02

Number of hours: 30 hours

Course Objectives:

- State and explain the constitution of India and its Constituent Assembly
- Explain fundamental rights and duties of citizen
- Identify union, state and federalism of India
- Knowledge of electoral process in India.
- State the basic concepts of Human Rights and its functions and authorities in society.

COURSE CONTENT:

Unit 1: Indian Constitution

5 hours

- Meaning and Importance of Constitution
- The Constituent Assembly
- The Preamble
- Salient Features of Constitution

Unit 2: Fundamental Rights and Directive Principles

3 hours

- Meaning and Differences between Fundamental Rights and Directive Principles
- Fundamental Rights
- Rights Information Act Meaning, importance of RTI 2005.

Unit 3: Union Government

4 hours

- President of India- Election, Powers and Position
- Prime Minister and council of Ministers
- Parliament – Lok-Sabha, Rajya Sabha- Organisations and Powers.

Unit 4: State Government

4 hours

- The Governor
- Chief Minister and Council of Ministers
- State Legislature Vidhana Sabha, Vidhana Parishad – organization and Powers

Unit 5: Federalism In India

2 hours

- Meaning Federal and Unitary Features

Unit 6: The Judiciary **2 hours**

- The supreme Court – Organization, Jurisdiction and Role
- The High Court – Organization Jurisdiction and Role

Unit 7: Electoral Process In India **2 hours**

- Election Commission – Organization, Functions

Unit 8: Local Governments **2 hours**

- Rural and Urban – Organisations, Powers and Functions

Unit 9: Human Rights **3 hours**

- Human rights – Meaning
- Universal Declaration of Human Rights
- Remedies against Violation of Human Rights in India

Unit 10: Special constitutional provisions **3 hours**

- Special Rights created in the constitution for: Dalits, Backwards, women and Children and the Religious and Linguistic Minorities.
- Constitution and Sustainable Development in India.
- Minority Commission in India.

Course Outcome:

- This course is to keep the students abreast with the knowledge of the Constitution of India.
- To make the students understand the importance of human rights as citizens of India.

Recommended Books

- Basu, D.D , Constitution of India, New Delhi Himalaya Publication ; 2001
- Dinesh Shelton, David P Stuart, International Human Rights in Nutshell. Thomas Burgentel, West Nutshell Publisher; London; 2005.
- ParvathyAppaiah, Constitution of India, Mangalore DivyaDeepa Publication; 2005
- ParvathyAppaiah, Human Rights. DivyaDeepa Publication Mangalore; 2016
- RajRam. M, Constitution of India Himalaya Publication, New Delhi; 1999.

SECOND SEMESTER

GENERAL PATHOLOGY

Course: Core

Credits: 4

Number of Hours: 60 hours

Course Objectives:

- To be able to define the medical terms, define and classify disease and understand the concepts of the disease.
- Able to describe the causes and mechanism of common diseases that occur during the routine work and also changes seen in different individuals and various organs and fluids.
- Able to enumerate the laboratory tests e.g.: urine, blood, body fluids and its application on various diseases.

COURSE CONTENT:

Unit 1: Introduction

(8 Hours)

Unit 2: Cellular Responses to Stress and Injury

(12 Hours)

- Types of cellular responses to injury
- Cellular adaptations
- In brief cell injury and types of cell injury, intracellular accumulation
- Necrosis and apoptosis (brief)
- Pathologic calcification, hyaline change, pigments

Unit 3: Acute Inflammation

(12 Hours)

- Definition, cardinal signs and sequence of events in acute inflammation
- List chemical mediators of inflammation, outcomes of acute inflammation, morphological types/patterns of acute inflammation and briefly systemic effects of inflammation
- In brief cutaneous wound healing (primary and secondary) Factors that influence wound healing, complications of wound healing
- Types of chronic inflammation, Granulomatous diseases, briefly about tuberculosis, leprosy and syphilis

Unit 4: Hemodynamic Disorders, Thromboembolism and Shock

(6 Hours)

- Edema and thrombosis

- Embolism, infarction and shock (in brief)

Unit 5: Diseases of the Immune System (8 Hours)

- Introduction to immune system
- Hypersensitivity reactions (brief)
- Autoimmune diseases and systemic lupus erythematosus (in brief)
- Acquired immunodeficiency syndrome

Unit 6: Neoplasia (8 Hours)

- Nomenclature of neoplasm's and characteristics of benign and malignant neoplasm's
- Metastasis and spread of tumors
- Etiology of cancer (carcinogenic agents)
- Laboratory diagnosis of cancer, staging grading and prognosis

Unit 7: Genetic Disorders (2 Hours)

- Introduction of genetic disease and classification of genetic disorders

Unit 8: Nutritional Disorders (4 Hours)

- Common vitamin deficiencies -Fat-soluble vitamins
- Water-soluble vitamins—vitamin B complex

Course Outcome:

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

- understand how body reacts to cellular responses and injuries.
- Have a basic knowledge about various laboratory tests and its application on various disorders.
- define the medical terms, define and classify disease and understand the concepts of the disease.

Recommended Books

- Nayak R, Rai S, Gupta A. Essentials in hematology and clinical pathology. New Delhi: Jaypee Brothers Medical Publishers; 2012.
- Mohan H. Textbook of pathology. 8th ed. New Delhi, India: Jaypee Brothers Medical; 2018

GENERAL MICROBIOLOGY

Course: Core

Credits: 04

Number of hours: 60 hours

Course Objectives:

- To become familiar with the foundation concepts of history of Microbiology & General Bacteriology.
- To understand the key concepts in Immunology.
- To gain the knowledge of common bacterial infections.
- To understand and implement biomedical waste management and tackle infections

COURSE CONTENT:

Unit 1: General Bacteriology

8 hours

Introduction & History of Microbiology, Classification & Morphology of Bacteria, Growth & Nutrition, Culture Media & Methods, Sterilization & Disinfection, Fundamental aspects of antibacterial agents and antimicrobial susceptibility testing.

Unit 2: Immunology

11 hours

Infection, Immunity, Immunization schedule, applications of antigen antibody reactions, Hypersensitivity, Tumor & Transplantation Immunology.

Unit 3: Systematic Bacteriology

13 hours

Common bacterial infections, Mycobacterium, Spirochetes'.

Unit – 4: Virology

10 hours

Introduction to virology, viral hepatitis, poliomyelitis, Rabies, Human immunodeficiency virus.

Unit 5: Mycology & Parasitology

12 hours

Introduction to mycology, pathogenic yeasts & fungi, Introduction to parasitology, Amoebiasis, Malaria, Helminthic infections.

Unit 6 : Applied Microbiology

6 hours

Hospital acquired infections, biomedical waste management.

Course Outcome:

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

- Understand how the bacteria grow and how sterilization & disinfection works.
- Have a basic knowledge about Immunization schedules and bacterial infections.
- Define terms in virology, mycology and parasitology.

Recommended Books

- Baveja C. Textbook of microbiology. 1st ed. New Delhi: Arya Publications; 2005.
- Textbook of Microbiology for MLT students by C. P. Baveja, 1st edition, Arya Publications.
- Textbook of Medical Laboratory technology, Ramnik Sood, 4th edition, Jaypee Publications.
- Allied Health Sciences Laboratory Technology

INTRODUCTION TO RESPIRATORY THERAPY EQUIPMENT

Core : Course

Theory: 30 hours

Credit: 02

Course Objectives: This course will provide an introduction to various equipment used within the scope of practice of Respiratory Therapist.

OUTLINE

1. Introduction to Mechanical Ventilation- Invasive and Non Invasive Ventilation.
2. Introduction to Oxygen Therapy - Low flow and High Flow, Fix and Variant Flow devices, Oxygen Cylinders.
3. Introduction to Artificial Airways- Types
4. Manual Resuscitators and Breathing Circuits
5. Overview of Aerosol Therapy Devices
6. Overview of Humidifiers
7. Types catheters and cannulas, Defibrillators, ABG Machine, Suction devices
8. Neonatal and Pediatric ICU Equipment
9. Medical Gas Cylinders
10. Pulmonary Function Laboratory Equipment
11. Bronchial Hygiene Devices- Cough Assist, Vest, Acapella, Flutter, PEP devices.

Course outcome:

At the end of the course, the student should be able to identify the equipment used in the RT department and the principles behind it.

Recommended books :

- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book

CARDIOPULMONARY APPLIED ANATOMY & PHYSIOLOGY

Core : Course

Theory: 30 hours

Credit: 02

Course Objectives: This course will provide an in-depth introduction to the anatomy and physiology respiratory system.

OUTLINE

1. Anatomy of Upper & Lower Airways
2. Muscles of Respiration & Mechanics Of Breathing
3. Anatomy of Heart Systemic Pulmonary And Coronary Circulation.
4. Lung Volumes and Capacities.
5. Ventilation and Perfusion Relationship.
6. Oxygen and Carbon Dioxide Transport.
7. Acid Base Chemistry.
8. Regulation of Respiration .
9. Cardiac Cycle and Cardiac Properties.
10. Regulation of Cardiac Output And Blood Pressure

Course outcome:

- Anatomy of airways and cardiovascular system
- Mechanics of breathing & circulation
- Lung volumes and capacities & oxygen and carbon-dioxide transport.

Recommended books

- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.
- Cairo JM. Mosby's Respiratory Care Equipment-E Book. Elsevier Health Sciences; 2017 Aug 24.
- White G. Equipment theory for respiratory care. Cengage Learning; 2014 May 5.

ENVIRONMENTAL STUDIES

Course: AECC

Credit: 02

Number of hours: 30 hours

Course Objectives:

- Students will be able to learn about environment, factors affecting it, environmental ethics and its protection.
- Students will be able to describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Students will be able to Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts.

COURSE CONTENT

Unit 1: Multidisciplinary nature of Environmental Studies (1hour)

- Multidisciplinary nature of Environmental Studies
- Concept of sustainability and sustainable development

Unit 2: Ecosystems (4 hours)

- What is an ecosystem? Structure and function of an ecosystem; Energy flow in the ecosystem; Food chains, food webs and ecological succession. Case studies of the following ecosystems:
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
- History of ecosystem ecology
- Ecosystem services

Unit 3: Natural Resources (5 hours)

Renewable and Non-renewable resources

- Land resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.

- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 4: Biodiversity and its conservation

(6 hours)

- Levels of biological diversity: genetic, species and ecosystem diversity; Bio geographic zones of India; Biodiversity patterns and global biodiversity hotspots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and informational value.
- Nature Reserves, tribal populations and rights, Human wildlife conflicts in Indian context

Unit 5: Environmental Pollution

(6 hours)

Définition

- Cause, effects and control measures of: -
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Light pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Climate change, Greenhouse effect, Global warming, Acid rain, Ozone layer depletion.
- Solid waste Management: control measures of urban and industrial wastes.
- Pollution case studies.

Unit 6 Environmental Policies & Practices

(3 hours)

- Environmental Laws: Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act

- Wildlife Protection Act
- Forest Conservation Act
- International Agreements: Montreal protocol, Kyoto protocol, Convention on Biological Diversity (CBD)
- Environmental Impact Assessment
- Carbon footprint
- Sustainable Development Goals

Unit 7: Human communities and the environment (3 hours)

- Human Population growth – impacts on environment
- Resettlement and rehabilitation of project affected persons: case studies
- Disaster management – floods, earthquake, cyclone and landslides
- Environmental movements: Chipko, Silent Valley, Bishnois of Rajasthan
- Environmental ethics
- Consumerism and Environment
- Environmental communication and public awareness, case studies.

Unit 8: Field work (2 hours)

- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc.

Course Outcomes:

- Students learn to knowledge on ECHO systems, biodiversity and environmental policies and practices.

Recommended Books:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
3. Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)
4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
5. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

6. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
7. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
8. Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.

HEALTH CARE

Core: AECC

Theory : 30 hours

Credit: 02

1. Introduction to Health:

Definition of Health, determinants of Health, Health Indicators of India, Health Team Concept. National Health Policy. National Health Program (Briefly Objectives and scope) Population of India and Family welfare program in India

2. Introduction to Nursing:

What is nursing? Nursing principles. Inter- Personnel relationships.

3. Bandaging :

Basic turns; bandaging extremities; Triangular Bandages and their application. Nursing Position, Bed making, prone, lateral, dorsal, dorsal re-cumbent, Fowler's positions, comfort measures, Aids and rest and sleep.

4. Lifting and Transporting Patients:

Lifting patients up in the bed. Transferring from bed to wheel chair. Transferring from bed to stretcher.

5. Bed Side Management:

Giving and taking Bed pan, Urinal: Observation of stools, urine. Observation of sputum, Understand use and care of catheters, enema giving.

6. Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion Care of Rubber Goods

7. Vital Parameter Recording :Recording of body temperature, respiration and pulse,

8. Asepsis :Simple aseptic technique, sterilization and disinfection. Surgical Dressing: Observation of dressing procedures

9. First Aid

Recommended Books: 1. Hari S. Essentials of Management for Healthcare Professionals. Productivity Press; 2017 Dec 15.

MEDICAL ETHICS

Course: AECC

Credit: 01

Number of hours: 30 hours

Course objectives:

- To understand the about the ethical importance in medicine
- Knowledge regarding ethical concepts and teaching/learning experience
- Understand the importance of informed consent and ethical issues in health care.

COURSE CONTENT

Introduction

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

➤ **Objectives:** Identify underlying ethical issues and problem in medical practice

Unit 1: Introduction to medical ethics

What is ethics, what are values and norms, freedom and personal Responsibility?

Unit 2: Definition of medical ethics

Major principles of medic ethics.

Unit 3: Perspective of medical ethics

The Hippocratic Oath, the Declaration of Helsinki, the WHO Declaration of Geneva, International code of Medical Ethics (1993), Medical Ccouncil of India Ccode of Ethics (2002).

Unit 4: Ethics of the individual

Truth and confidentiality, the concept of disease, health and healing, the Righttohealth.

Unit 5: The ethics of human life

Prenatal sex determination.

Unit 6: The family and society in medical ethics

Euthanasia, cancer and terminal care.

Unit 7: Death and dying

Use of life -support systems, the right to die with dignity, suicide–the Ethical outlook.

Unit 8: Professional Ethics

Contract and confidentiality, malpractice and negligence.

Course Outcomes:

- Increasing the awareness and knowledge of students of the value dimensions of interactions with the patients, colleagues, relations and public.
- Fostering the development of skills of analysis, decision making and judgment.
- Making the students aware of the need to respect the rights of the patient.
- Duties and responsibilities of the technologists.

Recommended Books:

- Tsai DF. The WMA medical ethics manual. Journal of Medical Ethics. 2006 Mar 1;32(3):163.

SOCIOLOGY

Core: AECC

Theory: 15 hours

Credit:1

Course Objective:

- To develop the abilities of students to analyse the sociological concepts and their relationship with social work practice.
- To understand Indian social problems and its impact on social development.
- To develop skills for social analysis.
- To develop an understanding of emerging issues of social concern and their impact on society.
- To develop basic understanding of health perspectives and their practice in social work.

Course Outline:

Unit I: Introduction to Sociology 3hrs

- Meaning, definitions and scope of sociology.
- Importance of its study with special reference to health care professionals.
- Methods of Sociological investigations - Case study, social survey, questionnaire, interview and opinion poll methods.

Unit II: Society, Family, Community and Socialization 4hrs

- Concept of society: Definition and characteristics.
- The family: Meaning, definitions and functions of family.
- Role of family on individual's health and nutrition,
- Meaning, definitions and types of communities: Rural, Urban and Tribal community
- Socialization: Meaning and characteristics, Process of socialization, Agencies of socialization and their role – Family, School, peer group, religion, media.

Unit III: Social Problems, Social Change, Social Planning, Social Work and Social security measures 5hrs

- Social Problems: Meaning, characteristics and their influence on health.
- Social Change : Meaning, definitions and characteristics.
- Social Planning: The role of social planning in the improvement of health and rehabilitation
- Social Work -Basic concepts of social work, definitions, objectives, values and basic methods. Role of social worker in health settings.
- Social Security: Social Security schemes for the disadvantaged sections in the society.

Unit IV: Socio-cultural factors in Health and Disease 3hrs

- Health: Concept, definitions and dimensions
- Meaning of social factors and role of social factors in health and disease.
- Culture and its influence on health and disease.

Recommended Books

12. Vineet V, Kumari A, Thakur A. Forced to Wed: Right to choose, if when and whom to marry. Human Rights. 1948 Dec 10.
13. BACHELOR O. PROPOSED DRAFT OF TEACHING...-IASE University.
14. Work MS. Rajiv Gandhi National Institute of Youth Development Sriperumbudur-602 105 Tamil Nadu.
15. Sociology of Health, Mohammed Akram, 2014. PremRawat for Rawat Publication-Jaipur

THIRD SEMESTER GENERAL PHARMACOLOGY

Course: Core

Credits: 04

Number of hours: 60 hours

Course objectives:

- Know the basics of Pharmacology like, sources of drugs, routes of drug administration and general principles
- Describe the principles of pharmacokinetics and pharmacodynamics
- To appreciate various adverse drug reactions
- To have a basic knowledge of drugs affecting various body systems

COURSE CONTENT:

Unit 1: General Pharmacology 8 Hours

- Introduction to Pharmacology
- Routes of drug Administration
- Absorption & Distribution
- Metabolism
- Excretion
- Pharmacodynamics - Mechanism of drug action- receptors
- Factors modifying drug actions
- Adverse drug reactions

Unit 2: Autonomic Nervous System drugs 6 Hours

- Sympathomimetics
- Alpha blockers
- Beta-blockers
- Cholinomimetics
- Anticholinergics
- Skeletal muscle relaxants.

Unit 3: Central Nervous System 11 Hours

- Opioid analgesics
- Non-opioid analgesics (Prostaglandins)
- NSAIDs

- Ethyl alcohol
- Sedative hypnotics
- Antiepileptic drugs
- Local anesthetics-1
- Local anesthetics-2
- General anesthetics- I
- G A – II (PAM)
- CNS stimulants.

Unit 4 : Cardio Vascular System Drugs

9 Hours

- Diuretics
- Vasodilators (CCB's, Drugs acting on RAS)
- Antihypertensives
- Antianginal drugs
- Pharmacotherapy of shocks
- Cardiac glycosides
- Cardioplegic drugs
- Antiarrhythmic drugs
- Primary solutions

Unit 5: Blood

6 Hours

- Anemia, erythropoietin
- Anticoagulants
- Anti-platelet drugs
- Fibrinolytics,
- Lipid lowering drugs
- Vit- D and calcium, folic acid, phosphate binders.

Unit 6: Endocrines

1 Hour

- Corticosteroids

Unit 7: Chemotherapy

9 Hours

- General Principles of Chemotherapy
- Sulfonamides
- Penicillin's
- Cephalosporins

- Broad spectrum antibiotics
- Macrolides
- Aminoglycosides
- Chemotherapy of UTI
- Drug Therapy of Tuberculosis.

Unit 8: Miscellaneous topics

10 Hours

- Antihistamines
- Antiemetics
- Drugs used in bronchial asthma-1
- Drugs used in bronchial asthma-2
- Cough
- Inhalational gases and emergency drugs
- I V fluids
- Metabolic and electrolyte imbalance
- Immunosuppressants
- Antiseptics and disinfectants

Course Outcomes:

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

- Define and describe the principles of pharmacology and pharmacotherapeutics
- Define absorption, distribution, metabolism and excretion of drugs
- Define, identify and describe the adverse drug reactions
- Define and describe the pharmacological actions and therapeutic uses of drugs affecting systems- autonomic nervous system, cardiovascular system, blood, endocrine etc.
- To have a basic knowledge of drugs used in the treatment of various infections
- To have a basic knowledge on miscellaneous drugs.

Recommended Books:

- Udaykumar P. Textbook of Pharmacology for Dental and Allied Sciences. Jaypee Brothers Publishers; 2008.

RESPIRATORY THERAPY SCIENCE- I

Core: Credit

Theory: 30 hours

Credit: 03

practical: 30 hours

Course Objectives

The course is designed to deliver comprehensive knowledge to students about the gas physics of medical gases, their manufacturing, transportation, storage and variety of devices used to deliver them in a clinical setting. The students will be trained in Basic cardiac life support, Aerosol therapy and Airway Clearance therapy modules and the applied areas.

Course Outline

Topic

1 Basic Cardiac Life Support

- Heart attack and Cardiac arrest
- Importance and application of Chain of Survival
- Cardiopulmonary and cerebral resuscitation- Rationale, indication, technique.
- Difference between adults, children and infants CPR
- Automated External Defibrillation- Indication, technique, Special considerations
- Choking in adults, children and infants- Indicators and management
- Airway management
- ✓ Maintaining patent airway
- ✓ Basic Airway Adjuncts:
 - Nasopharyngeal Airway
 - Oropharyngeal Airway (Guedel, Berman airways)
 - Bag valve mask ventilation- Flow and Self inflating

2 Introduction to Basic Respiratory Science Basic Physics for the Respiratory Therapist:-

- Behavior of gases, Gas pressure
- Gas laws:
 - ✓ Boyle's Law Charles' and Gay-Lussac's Laws
 - ✓ Fick's Law, Henry's Law, Graham's Law

- ✓ Combined Gas Law
- ✓ Dalton's Law of Partial Pressures
- ✓ Avogadro's Law
- ✓ Laws of Diffusion

Combined gas law's

3 **Medical Gases**

3.1 Manufacture and Properties of Medical Gases

Air, Oxygen (O₂), Carbon Dioxide (CO₂), Helium (He), Nitric Oxide (NO), Nitrous Oxide (N₂O)

3.2 Storage, and Transport of Medical Gases

Transporting/handling/ storage/safety, Sizes/volumes, Colour codes, Conversion factors/duration of contents, Cylinder markings

Medical gas supply equipment

Compressors, Concentrators, Liquid reservoirs systems, Piping systems

Reducing and Safety Valves

Single-stage reducing valve, Modified single-stage reducing valve Multistage reducing valve, Reducing valve safety features, Direct acting cylinder valve, Diaphragm cylinder valve, Cylinder Safety valve.

4. **Regulators and Flow meters**

Single stage and Multistage regulators, Thorpe tube flow meters, Burden gauge flow meters, Flow restrictors, Compensated and Uncompensated Thorpe-tube flow meters.

5. **Oxygen therapy**

Assessment of Need

5.1 Assessing of outcome

5.2 Precautions and Hazards

5.3 Delivery approach, Protocol based Oxygen therapy

5.4 Delivery devices

5.5 Low flow:-

✓ Masks

✓ Cannulas

✓ Catheters

5.6 High Flow:-

- Entrainment devices
- High flow nasal cannula therapy

5.7 Other Devices:-

- Hoods, tents, Incubators etc.
- Oxygen controllers (proportions, blenders)

5.8 Other Devices:-

- Hoods, tents, Incubators etc.
- Oxygen controllers (proportions, blenders)

5.9 Domiciliary Oxygen Therapy- Indications, Prescription, Maintenance

5.10 Oxygen therapy guidelines.

Hyper baric oxygen therapy

Physiological effects, Methods of administration, Indications and Contraindications, Complications and Hazards, Troubleshooting

6. Oxygen analyzers

Physical oxygen analyzers, Electrical oxygen analyzers, Electrochemical oxygen analyzers

7. Artificial Resuscitators (Bag Valve Units)

- Types of Artificial Resuscitators- Manual, Expired Air, Flow/Oxygen powered
- Specification and standards
- Manual Resuscitators- Types, parts
- Indications and Techniques
- Hazards Associated with Manual Resuscitators
- Inspection & Troubleshooting
- T- piece resuscitator

8. Humidity and Aerosol Therapy

- Physiology of Heat and Moisture Exchange, Indications for Humidification and Warming of Inspired Gases, Types of humidifiers and Equipment, Problem Solving and Troubleshooting

Bland Aerosol Therapy

- Equipment, Sputum Induction, Selecting the Appropriate Therapy

Aerosolized Drug Therapy

- Characteristics of Therapeutic Aerosols, Hazards of Aerosol Therapy, Aerosol Drug Delivery Systems

9. Airway Clearance and Bronchial Hygiene

- Mechanism of Coughing
- Physiology of Airway Clearance Therapies
- General Goals and Indications
- Determining the Need for Airway Clearance Therapy
- Airway Clearance Methods- Active Cycle of Breathing Techniques, Autogenic Drainage, Forced Expulsion Techniques like Coughing and Huffing, Cough Assist
- Postural drainage and Chest Physiotherapy- Devices for CPT- Precursors', Vest,
- Selecting Airway Clearance

Techniques Endo tracheal suctioning-

- Indications, Contraindications, Complications, Assessment of need, Assessment of outcome, Types of suction, Clinical aspects of Suction techniques, Suction catheters (Open and Closed), Suction regulators, Portable suction Units

10. Lung Expansion Therapy

- **Incentive Spirometer's**
 - Volume-Displacement Devices
 - Flow-Dependent Devices
- **Intermittent Positive-Pressure Breathing Devices**

- **Positive Airway Pressure (PAP) Devices**
 - Continuous Positive Airway Pressure
 - Bi-level Positive Airway Pressure
- **Positive Expiratory Pressure-** Acapella, Flutter
- **Thoracic expansion exercises, Breathing exercises and Ventilatory Muscle training- Techniques**

11. Noninvasive monitoring of Oxygen and Carbon dioxide

- Pulse oximetry
- Co-oximetry
- Colorimetric End-tidal determination
- End-tidal Capnography
 - a) Main and Side stream
 - b) Waveform morphology and applications
- Transcutaneous monitoring
 - ✓ Transcutaneous monitoring of carbon-di-oxide
 - ✓ Transcutaneous monitoring of oxygen

Course outcome:

- Describe the importance of infection control in respiratory care practices
- Identify a cardiac arrest scenario and perform basic cardiac life support
- Explain the importance of gas laws and physics
- Understand oxygen and other medical gas delivery systems; application and the related adjuncts
- Describe concept and application of humidity and aerosol therapy
- Apply the skills required to select the appropriate therapeutic modalities based on patient's need in clinical settings

Recommended books

- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.
- Cairo JM. Mosby's Respiratory Care Equipment-E Book. Elsevier Health Sciences; 2017 Aug 24.
- White G. Equipment theory for respiratory care. Cengage Learning; 2014 May 5.
- Butler TJ. Laboratory exercises for competency in respiratory care. FA Davis; 2013 Mar 8.

PATIENT ASSESSMENT AND DIAGNOSTICS

Core: Course

Theory: 45 hours

Credit: 04

Practical: 30 hours

Course Objective :

This course is an introduction to the respiratory therapy student on the skills necessary for a respiratory therapist to evaluate an individual referred for respiratory care.

Course Outline

Topic

1. Preparation for the Patient Meeting

1.1 Individualized Care

- Providing Empathetic Two-Way Communication
- Respecting Patient Needs and Preferences
- Assuring Privacy and Confidentiality
- Being Sensitive to Cultural Values

1.2 Patient Involvement

- Assessing Learning Needs and Providing Patient Education
- Sharing Goal-Setting and Decision-Making Responsibilities
- Encouraging Patient and Family Participation in Care and Safety

1.3 Provider Collaboration

- Enhancing Interprofessional Communication
- Coordinating Patient Care
- Sharing Responsibility

2. Medical History and Interview

2.1 Patient Interview

- Principles of Communication
- Structuring the Interview
- Questions and Statements Used to Facilitate
- Conversational Interviewing
- Alternative Sources for a Patient History

2.2 Cardiopulmonary History and Comprehensive Health History

- Variations in Health Histories
- General Content of Health Histories
- Review of Systems Chief Complaint
- History of Present Illness
- Past History
- Family History
- Occupational and Environmental History

2.3 Reviewing the Patient's Medical Record

- Admission Note
- Physician Orders
- Progress Notes
- DNAR/DNR Status

2.4 Assessment Standards for Patients with Pulmonary Dysfunction

3. Cardiopulmonary Symptoms

3.1 Cough

- Causes and Clinical Presentation
- Descriptions

3.2 Sputum Production

- Causes and Descriptions

3.3 Hemoptysis

- Definition
- Causes and Descriptions
- Hemoptysis versus Hematemesis

3.4 Shortness of Breath (Dyspnea)

- Dyspnea Scoring Systems
- Causes, Types, and Clinical Presentation of Dyspnea Descriptions

3.5 Chest Pain

- Pulmonary Causes of Chest Pain Descriptions

3.6 Dizziness and Fainting (Syncope)

- Definition, Causes, Descriptions

3.7 Swelling of the Ankles (Dependent Edema)

- Definition, Causes, Descriptions

3.8 Fever, Chills, and Night Sweats

- Definitions
- Causes
- Fever with Pulmonary Disorders

3.9 Headache, Altered Mental Status, and Personality Changes

3.10 Snoring and Daytime Somnolence (Sleepiness)

- Incidence and Causes of Snoring
- Clinical Presentation
- Gastroesophageal Reflux

4. Vital Signs

4.1 Obtaining Vital Signs and Clinical Impression

4.2 Frequency of Vital Signs Measurement

4.3 Trends in the Vital Signs

Comparing Vital Signs
Information

4.4 Height and Weight

General Clinical Presentation

- Pain Level and Type
- Level of Consciousness (Sensorium)

4.5 Temperature

- Fever
- Hypothermia
- Measurement of Body Temperature

4.6 Pulse

- Measurement of Pulse Rate
- Pulse Rhythm and Pattern

4.7 Respiratory Rate and Pattern

- Measurement of Respiratory Rate and Pattern

4.8 Blood Pressure

- Measurement of Blood Pressure
- Effects of the Respiratory Cycle on Blood
- Pressure and Pulse Intensity

5. Fundamentals Of Physical Examination

5.1. Examination of the Head and Neck

- Head and Face Eyes
- Neck

5.2. Lung Topography

- Imaginary Lines
- Thoracic Cage Landmarks Lung Fissures
- Tracheal Bifurcation
- Diaphragm
- Lung Borders

5.3. Examination of the Thorax

- Inspection
- Palpation

- Percussion of the Chest to Assess Resonance
 - Auscultation of the Lungs
- 5.4. Examination of the Precordium
- Review of Heart Topography
 - Inspection and Palpation
 - Auscultation of Heart Sounds
- 5.5. Examination of the Abdomen: Inspection, Palpation, Percussion and Auscultation
- 5.6. Examination of the Extremities
- Clubbing
 - Cyanosis
 - Pedal Edema
 - Capillary Refill
 - Peripheral Skin Temperature
 - Assessment of Hydration: Skin Turgor

6. Neurologic Assessment

6.1 Functional Neuroanatomy Assessment of Consciousness

- Assessing Consciousness
- Glasgow Coma Scale, AVPU
- Mini-Mental State Examination
- Assessment of Consciousness in the Intensive Care Unit

6.2 Cranial Nerve

Examination Sensory

Examination Motor

Examination

Deep Tendon, Superficial, and Brainstem Reflexes

- Deep Tendon Reflexes Superficial Reflexes
- Brainstem Reflexes

6.3 Vital Organ Function and the Neurologic System

- Control of Breathing
- Control of Cardiovascular System

6.4 Ancillary Testing of the Neurologic System

- Imaging, Electroencephalography
- Lumbar Puncture
- Intracranial Pressure Monitoring

6.5 Declaration of Brain Death: Guidelines, Apnea test

7. Clinical Laboratory Studies

7.1 Clinical Laboratory Overview

- Phases of Laboratory Testing
- Composition of Blood
- Specimen Integrity and Effect on Test Results
- Laboratory Test Parameters

7.2 Hematology

- Complete Blood Count
- Erythrocyte Sedimentation Rate
- Coagulation Screening Tests

7.3 Chemistry

- Basic Metabolic Panel
- Renal Panel
- Hepatic Panel
- Lipid Panel
- Cardiac Biomarkers

7.4 Microbiology

- Pre-analytical Phase: Specimen Selection, Collection, and Transport
- Microscopic Examination of Specimens Culture and Sensitivity
- Examination of Pulmonary Secretions Bronchoalveolar Lavage
- Pleural Fluid Examination

7.5 Histology and Cytology Skin

Testing

Recommended Laboratory Tests

8. Arterial Blood Gas Sampling and Interpretation

8.1 Indications for Blood Gas and Oximetry Analysis Sampling and Measurement

- Invasive Blood Sampling
- Noninvasive Approaches

8.2 Assessment of Oxygenation

- Partial Pressure of Oxygen (PaO₂)
- Hemoglobin (Hb) and Hb Saturation (SaO₂, SpO₂)
- Dyshemoglobins
- Arterial O₂ Content (CaO₂)
- O₂ Delivery and Hypoxia

8.3 Assessment of Acid-Base Balance: Observed and Calculated basic values

- pH
- Partial Pressure of Carbon Dioxide (PaCO₂)
- Plasma Bicarbonate
- Base Excess (BE)
- Henderson-Hasselbalch Equation

8.4 Simple Acid-Base Imbalances and its compensation

- Respiratory Acidosis: Acute and Chronic compensation
- Respiratory Alkalosis: Acute and Chronic compensation
- Metabolic Acidosis: Anion gap calculation and
Differential diagnosis: Compensation
- Metabolic Alkalosis: Compensation

8.5 Combined Acid-Base Disturbances

- Respiratory and Metabolic Acidosis
- Metabolic and Respiratory Alkalosis

8.6 Quality assurance

- Pre-analytic Errors
- Analytic Errors
- Post-Analytic Errors

8.7 Systematic Interpretation of Blood Gases

- Oxygenation Assessment
- Acid-Base Assessment

9. Chest Radiography

9.1 Introduction to Chest Radiography

9.2 Indications for the Chest Radiograph

9.3 Examination Radiographic Views

- Standard and Special Views
- Portable Chest Image (Anteroposterior View)
- X-ray for patient in intensive care unit

9.4 Evaluation of the Chest Radiograph

- Review of Clinical Findings
- Systematic Approach to the Chest Radiograph Interpretation
- Limitations
- Common terms in Chest X-ray Interpretations

9.5 Clinical and Radiographic Findings in Lung Diseases

- Localizing lesions: The lungs, The heart
- The white lung field: Collapse, Volume loss, Consolidation, Pneumonia, Pleural effusion, Lung nodule, Cavitating lesion: TB, Lung abscess, Cardiogenic and Non-cardiogenic pulmonary edema, Bronchiectasis, Lung Fibrosis
- The black lung field: Chronic Obstructive Pulmonary Disease, Asthma, Pneumothorax, Tension Pneumothorax, Pulmonary embolus
- The abnormal Hilum: Unilateral Hilar enlargement, Bilateral hilar enlargement
- The abnormal heart shadow: Pericardial effusion, Cardiomegaly, Congestive Heart failure
- Abnormal ribs: Rib fractures
- Abnormal soft tissues: Surgical emphysema

9.6 Postprocedural Chest Radiograph Evaluation

- Tracheal Intubation, Central Venous Pressure Line, Pulmonary Artery Catheter Placement, Pacemaker, Nasogastric Feeding Tubes, Chest Tubes

10. Electrocardiogram Interpretation

10.1 Electrocardiogram: Cardiac Electrophysiology.

10.2 Conduction system of the Heart

10.3 Basic Electrocardiogram Waves

- Electrocardiogram Paper and Measurements
- Normal ECG waves
- Evaluating Heart Rate

10.4 Electrocardiogram Leads

- Limb Leads
- Chest Leads
- Evaluating the Mean QRS Axis

10.5 Steps of Electrocardiogram Interpretation

10.6 Normal Sinus Rhythm

10.7 Causes and Manifestations of Dysrhythmias

10.8 Identification of Common Dysrhythmias

10.9 Tachy-arrhythmias

- Premature Atrial Contraction, Sinus tachycardia, Supraventricular tachycardia, Junctional rhythm, Atrial flutter, Atrial fibrillation, Premature Ventricular Contraction, Ventricular tachycardia

10.10 Cardiac Arrest Rhythms

- Pulseless Ventricular Tachycardia, Ventricular Fibrillation, Pulseless Electrical Activity (PEA), Asystole

10.11 Brady-arrhythmias

- Sinus Bradycardia, Sick Sinus syndrome, Junctional rhythms

10.12 Heart Blocks

- First, Second, Third degree heart block, left bundle branch block

11. Documentation

12.1 General Purposes of Documentation

12.2 The Joint Commission and Legal Aspects of the Medical Record

12.3 Types of Medical Records Organizing Patient Information

12.4 Charting Methods

- Subjective, Objective, Assessment, and Plan (SOAP) Charting
- Assessment, Plan, Implementation, and Evaluation (APIE) Charting
- Problem, Intervention, and Plan (PIP) Charting
- Situation, Background, Assessment, and Recommendation (SBAR) Charting

- Hospital Medical Record keeping and Electronic medical reports

Course outcome:

1. Identify the elements needed for patient encounter for those receiving or being evaluated for respiratory care.
2. Demonstrate knowledge and skills for history taking and interviewing patients with cardiopulmonary complaints.
3. Describe the causes and the common characteristics of cardiopulmonary symptoms.
4. Obtain, evaluate, and monitor vital signs of patients with cardiopulmonary deficiencies.
5. Perform physical examination in patients evaluated for respiratory care.
6. Interpret clinical laboratory data, electrocardiograph and Chest X-ray.
7. Explain the assessment, plan, implementation, and evaluation method and the problem, intervention, and plan method for documentation of patient assessment data.

Recommended books

- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.
- Cairo JM. Mosby's Respiratory Care Equipment-E Book. Elsevier Health Sciences; 2017 Aug 24.
- White G. Equipment theory for respiratory care. Cengage Learning; 2014 May 5.
- Butler TJ. Laboratory exercises for competency in respiratory care. FA Davis; 2013 Mar 8.
- James K. Stoller Wilkins' Clinical Assessment in Respiratory Care. 8th ed.
- Primary: Beasley, B. Understanding EKGs: A Practical Approach 5th edition

CARDIOPULMONARY DISEASES I

Core: Course

Theory: 30 hours

Credit:02

Course Objective This course is designed to teach the respiratory therapy student about the pathological changes, clinical findings and treatment of major cardiopulmonary diseases.

Course Outline

Topic

1. CARDINAL MANIFESTATIONS AND PRESENTATION OF DISEASES

Alteration in circulatory and Respiratory Functions

- 1.1 Dyspnea
- 1.2 Cough
- 1.3 Chest Pain and Palpitations
- 1.4 Hematemesis and Hemoptysis
- 1.5 Hypoxia and Cyanosis
- 1.6 Fever
- 1.7 Edema

2. Respiratory Insufficiency and Respiratory Failure

- 2.1 Classification Background, Pathophysiology, Etiology and Management of Respiratory failure

3. OBSTRUCTIVE LUNG DISEASES

Chronic Obstructive Pulmonary Disease (COPD), Chronic Bronchitis and Emphysema

- 3.1 Anatomic alterations of the lungs associated with Chronic Bronchitis and Emphysema

- 3.2 Etiology and Epidemiology, Risk factors, Diagnosis and assessment of Chronic Obstructive Pulmonary Disease
- 3.3 Distinguishing features between Emphysema and Chronic Bronchitis
- 3.4 Cardiopulmonary clinical manifestations associated with Chronic Bronchitis and Emphysema
- 3.5 General management of COPD
- 3.6 Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines of COPD

4. Asthma

- 4.1 National Asthma Education and prevention program
- 4.2 Global Initiative for Asthma (GINA) guidelines
- 4.3 Anatomic alterations of the lung
- 4.4 Etiology, Classification and Epidemiology, Diagnosis of Asthma
- 4.5 Cardiopulmonary clinical manifestations associated with Asthma
- 4.6 General Management of Asthma
- 4.7 Respiratory care treatment protocols

5. Cystic Fibrosis

- 5.1 Anatomic alterations of the lung
- 5.2 Etiology and Epidemiology
- 5.3 Cardiopulmonary clinical manifestations, Pancreatic insufficiency associated with Cystic Fibrosis
- 5.4 General Management of Cystic fibrosis
- 5.5 Heart or Heart-Lung transplantation

6. Bronchiectasis

- 6.1 Anatomic alterations of the lung
- 6.2 Etiology and Epidemiology
- 6.3 Diagnosis, Cardiopulmonary clinical manifestations associated with Bronchiectasis
- 6.4 General and Pharmacological management for Bronchiectasis

7. LOSS OF ALVEOLAR VOLUME

Atelectasis

- 7.1 Anatomic alterations of the lung
- 7.2 Etiology , Classification of Atelectasis
- 7.3 Cardiopulmonary clinical manifestations associated with Postoperative Atelectasis

8. INFECTIOUS PULMONARY DISEASE

Pneumonia, Lung Abscess Formation and Important Fungal Diseases

- 8.1 Pneumonia: Anatomic alterations of the lungs
- 8.2 Etiology and Epidemiology Community acquired Pneumonia
- 8.3 Chronic Pneumonia
- 8.4 Fungal diseases: Anatomic alterations of the lungs
- 8.5 Primary pathogens
- 8.6 Viral Pneumonia
- 8.7 Pneumonia in the immunocompromised patients
- 8.8 Necrotizing Pneumonia and Lung Abscess
- 8.9 Bronchiolitis Obliterans Organizing Pneumonia (BOOP)
- 8.10 Cardiopulmonary clinical manifestations associated with Pneumonia
- 8.5 General management of Pneumonia

9. Tuberculosis (TB)

- 9.1 Anatomic alterations of the lung
- 9.2 Etiology and Epidemiology, Types of Tuberculosis
- 9.3 Tuberculosis among health care workers
- 9.4 Diagnostic tests, Cardiopulmonary clinical manifestations associated with Tuberculosis
- 9.5 General Management of Tuberculosis

10. PULMONARY VASCULAR DISEASE

10.1 Pulmonary edema

- 10.2 Anatomic alterations of the lung
- 10.3 Etiology and Epidemiology
- 10.4 Cardiogenic and Non-Cardiogenic Pulmonary Edema
- 10.5 General management of Pulmonary Edema
- 10.6 Cardiopulmonary clinical manifestations associated with Pulmonary Edema

11. Pulmonary Vascular Disease:

Pulmonary Embolism

- 11.1 Anatomic alterations of the lung
- 11.2 Etiology and Epidemiology
- 11.3 Diagnosis and Screening
- 11.4 General management of Pulmonary Embolism
- 11.5 Cardiopulmonary clinical manifestations associated with Pulmonary Embolism

Pulmonary Hypertension

- 11.6 Pulmonary Hypertension due to lung disease
- 11.7 Emerging role of Respiratory Therapist in Pulmonary Vascular Disorders

12. CHEST WALL AND SPINAL DIFORMITIES

Pleural Effusion and Empyema

- 12.1 Anatomic alterations of the lung
- 12.2 Pleural anatomy and Physiology
- 12.3 Etiology and Epidemiology
- 12.4 Hydrothorax, Hemothorax, Urinothorax, Chylothorax, Pyothorax
- 12.5 Cardiopulmonary clinical manifestations associated with Pleural Effusion and Empyema
- 12.6 General management of Pleural Effusion

13. Kyphoscoliosis

- 13.1 Anatomic alterations of the lung
- 13.2 Etiology and Epidemiology
- 13.3 Kyphosis and Scoliosis
- 13.4 Pectus Excavatum and Pectus Carinatum
- 13.5 Cardiopulmonary clinical manifestations associated with Kyphoscoliosis
- 13.6 General management of Scoliosis
- 13.7 Respiratory Care Treatment Protocols

14. LUNG CANCERS

Carcinomas of Lung

- 14.1 Anatomic alterations of the lungs
- 14.2 Types, Etiology and Epidemiology
- 14.3 Diagnosis and Screening
- 14.4 Cardiopulmonary clinical manifestations associated with Cancer of the Lung
- 14.5 Staging of Lung Cancer
- 14.6 General management of Lung Cancer

15. INTERSTITIAL AND INFLAMMATORY LUNG DISEASE

Interstitial Lung Disease (ILD)

- 15.1 Anatomic alterations of the lungs
- 15.2 Etiology and Epidemiology
- 15.3 Classification of ILD
- 15.4 Cardiopulmonary clinical manifestations associated with Chronic Interstitial Lung Disease
- 15.5 General management of Interstitial Lung Disease

16. Inflammatory Lung Disease and its Pulmonary effects

- 16.1 Rheumatoid Arthritis and Pulmonary complications
- 16.2 Pulmonary involvement in Systemic Sclerosis

17. DIFFUSE ALVEOLAR DISEASE

Acute Respiratory Distress Syndrome (ARDS)

- 17.1 Anatomic alterations of the lung
- 17.2 Etiology and Epidemiology
- 17.3 Diagnostic criteria for Acute Respiratory Distress Syndrome
- 17.4 The National Institute of Health ARDS network
- 17.5 Cardiopulmonary clinical manifestations associated with ARDS
- 17.6 General management of ARDS
- 17.7 Recent updates in ARDS management

18. NEURO-RESPIRATORY DISORDERS

Gullian-Barré (GB) Syndrome

- 18.1 Anatomic alterations of the lungs associated with Gillian-Barré Syndrome
 - 18.2 Etiology and Epidemiology
 - 18.3 Clinical presentation
 - 18.4 Cardiopulmonary clinical manifestations
- General Management

19. Myasthenia Gravis (MG)

19.1 Anatomic alterations of the lungs

19.2 Etiology and Epidemiology

19.3 Screening and Diagnosis

19.4 Cardiopulmonary clinical manifestations

19.5 General management

20. Cardiopulmonary Care and Assessment of Patients with Neuromuscular Disease

20.1 Chronic neuromuscular disease

20.2 Cardiopulmonary clinical manifestations associated with neuromuscular diseases

20.3 General management of neuromuscular disease

20.4 Ventilatory management of patients with neuromuscular disease

Course Outcome:

1. Enumerate the pathological changes that occurs in the pulmonary system of patients suffering from cardiopulmonary diseases
2. Describe and diagnose clinical features and outline the treatment of cardiopulmonary disease
3. Appreciate the role of the respiratory therapist in the management and diagnosis of cardiopulmonary disease

Recommended books

- Terry Des Jardins & George G. Burton: Clinical Manifestations and Assessment of Respiratory Disease. 8th edition. Cairo JM. Mosby's Respiratory Care Equipment-E Book. Elsevier Health Sciences; 2017 Aug 24.
- White G. Equipment theory for respiratory care. Cengage Learning; 2014 May 5.
- Harrison's Principles of Internal Medicine. 20th edition. James K. Stoller Wilkins' Clinical Assessment in Respiratory Care. 8th ed.
- Charles V. Pollack. Differential diagnosis of Cardiopulmonary Disease. 1st edition
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18

CLINICAL TRAINING I

Core: Course

Practical + Clinical Postings: 330 hours

Credit:04

Course Objectives:

This course will provide a practical and demonstrative approach about the patient contact techniques, oxygen therapy and artificial airways and various devices in respiratory care.

It comprises of clinical postings and practicum and demonstration classes.

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

- Practical demonstration for the topics learnt during theory classes
- Clinical postings to enhance clinical skills learnt during practical

SERIAL NO.	TOPICS
1.	Practicum on patient communication & medical history taking
2.	Practicum on Universal precautions & hand washing hygiene
3.	Practicum on assessment of vital signs & physical assessment of the Thorax & Extremities
4.	Practicum and demonstration of medical gas cylinders, oxygen concentrators, oxygen therapy devices
5.	Practicum on Assessment of Respiratory system, CVS
6.	Practicum and demonstration on use of Aerosol & Humidification delivery devices
7.	Practicum and demonstration for various artificial airways
8.	Practicum and demonstration of Chest Physiotherapy Procedures & Bronchial hygiene techniques
9.	Practicum & demonstration of Basic Life Support skills
10.	Practicum on Interpretation of ECG
11.	Practicum on Case studies.

KANNADA

Course: AECC

Credits: 02

Number of hours: 60

hours

Course Objectives

- Enable students to learn alphabet, words and simple sentences in Kannada.
- Enable students to enhance speaking and writing communicative skills in Kannada and learn technical words related to medical science

COURSE CONTENT:

Unit I: Kannada Letters (vowels, Consonant)

Unit II: Words, Phrases, formation of sentences, Letter Writing, Essay Writing.
Treatment related Kannada words (from English to Kannada)

Unit III:

- 1) Possible communication in kannada between Patients and Doctors.
- 2) Advising sentences to the possible questions of patients.
- 3) Some important sentences which enable to communicate with doctors and colleagues.

Course Outcome

- Allied health science students will be able to attend health issues of native Kannada speaking patients more effectively.
- They can also act as a bridge between doctors and patients.

Recommended Books

- Kannada Vyakarana – (8th ,9th and 10th Karnataka government text books)
HSK, Vyavahika, Kann

FOURTH SEMESTER

CARDIOPULMONARY PHARMACOLOGY

Core: Course

Theory: 30 hours

Credit: 02

Course Objectives

This course provides a study of basic pharmacological principles/practices of respiratory care drugs. The course content emphasizes various drugs used to treat cardiopulmonary diseases.

Course Outline

Topic

1. Administration of Aerosolized & Instilled Medications:

- 1.1 Describe general advantages and disadvantages associated with the delivery of aerosolized medications.
- 1.2 Describe the three most common devices used to administer aerosolized Respiratory Care drugs, their advantages and disadvantages, optimal procedures for effective medication delivery, basic care of MDIs, SVN, DPIs
 - a. Small Reservoir Nebulizer (SVN)
 - b. Metered Dose Inhaler (MDI)
 - c. Dry Powder Inhaler (DPI)
- 1.3 Describe the use of SVNs and MDIs for aerosol drug administration during continuous mechanical ventilation.
- 1.4 Describe the clinical situations in which continuous and high-dose, high frequency aerosol bronchodilator therapy would be indicated.
- 1.5 Define drug administration by instillation including advantages and disadvantages of utilizing this method for medication delivery.
- 1.6 Describe how to select the most appropriate aerosol delivery device for a
 - b. patient.

2 Drugs affecting Respiratory system:

Bronchodilator drugs-

2.1 Differentiate between bronchoconstriction & bronchospasm, pathological triad of mechanisms leading to bronchoconstriction, types of bronchodilator.

2.2 Role of the sympathetic receptor site intracellular chemical (c-AMP) & role of the parasympathetic receptor site intracellular chemical (c-GMP).

2.3 Generic name, Trade name, Mode of action, Receptor site stimulation, Side effects & Usual adult dosage of following drugs:

- Sympathomimetic/adrenergic bronchodilators.
- Parasympatholytic/anti-cholinergic/anti-muscarinic bronchodilator drugs.
- Xanthine drugs.

2.4 Given various patient clinical scenarios, be able to suggest the most appropriate bronchodilator therapy, including drug of choice, route of delivery, and recommended dosage

3 Mucus Controlling Therapy-

3.1 Key terms associated with mucokinetics, mucolytics, mucoactive drugs

3.2 Physical characteristics of the mucociliary system of the lung, Types of secretory glands, Anatomical structures, Normal structure and composition of mucus, Normal ciliary function, describe various factors that can adversely affect the mucociliary system.

3.3 Identify substances that lyse/breakdown pulmonary secretions, Compare and contrast major mucolytic drugs, Identify the dosage ranges for each mucolytic drug, describe hazards and contraindications associated with each mucolytic drug, Identify delivery methods for each drug.

4. Anti-Inflammatory and Anti- Asthma Agents:

Corticosteroids-

- 4.1 . Describe key terms and abbreviations, inflammatory process, contrast humoral (circulating) and cell-mediated immunity, Humoral immunity process involving mast cells and antigen/antibody reactions, early phase and late phase inflammatory response.
- 4.2 Describe the three major effects of corticosteroids, differentiate between anabolic and catabolic steroids, describe the hypothalamic-pituitary-adrenal (HPA) axis for control of normal body corticosteroid production, describe how “exogenous (outside the body)” steroid therapy can suppress the HPA axis and lead to “steroid dependency”.
- 4.3 Describe potential side effects associated with prolonged/long-term systemic steroid therapy, identify common oral and aerosolized steroid drugs used in the treatment of respiratory disease, advantages and disadvantages associated with the use of aerosolized corticosteroid drugs, characteristics of oral versus aerosol delivered corticosteroids.
- 4.4 Identify how the procedure for administering MDI/DPI steroid preparations should be modified in contrast to other types of medications delivered in this form.

5. Non-Steroidal Anti-Asthma Agents (NSAAA)

- 5.1 Mode of action, Mode of administration, Trade names, Usual adult dosages & Hazards/ Precautions of NSAAA
- 5.2 Role of cromolyn sodium and nedocromil sodium, leukotriene antagonists/modifiers in the prevention of bronchospasm and airway inflammation.

6. Anti-Infective Agents:

- 6.1 Describe the rationale for aerosol administered anti-infective agents, describe the clinical effectiveness of administering anti-infective agents to the lungs via the inhalational route.
- 6.2 Identify special clinical situations that would indicate the use of this administration method for anti-infective therapy, potential side effects and hazards associated with using this route for anti-infective drug delivery.
- 6.3 Identify various common anti-infective agents administered by the RCP in clinical practice (Antibacterial agents, Antiviral agents, Antifungal agents)

7. Drugs affecting Cardiovascular system:

(Mode of action, Mode of administration, Trade names, Usual adult dosages & Hazards/ Precautions of each of these following drugs:)

7.1 Anti-hypertensive drugs

7.2 Anti- Arrhythmic drugs

7.3 Drugs affecting vascular tone and volume of circulation, renin angiotensin in system & other mechanisms of affecting these systems.

7.4 pharmacology and physiology of inhaled nitric oxide

8. Drugs used in Acute Care

(Mode of action, Mode of administration, Trade names, Usual adult dosages & Hazards/ Precautions of each of these following drugs:)

8.1 Drugs used in Cardiac arrest and Pre Arrest

8.2 Drugs used in Acute Coronary Syndrome

8.3 Drugs used in Cerebrovascular Accidents

Course outcome:

- Understand the fundamental scientific principles of aerosolized medications to treat lung diseases.
- Discuss various classification of drug used to treat bronchospasm and cause bronchodilation, their mechanism of action, effects and side effects on cardiopulmonary systems.
- Discuss various types of mucous controlling agents and their mode of actions.
- Understand the mechanism of drugs used to control asthma symptoms including Corticosteroids and NSAIDs.
- Discuss the various anti-infective drugs used to treat patients with infectious lung diseases, their clinical effectiveness via using the inhalational route.
- Discuss the principles of drugs used to treat various cardiovascular diseases and their effectiveness & potential hazards.
- Describe all the drugs used to manage life threatening conditions including arrhythmias and cardiac arrest.
- Recommend modifications in the Respiratory Care plan based on the patient's response to Respiratory Care medications.

Recommended books

- Douglas S. Gardenhire Rau's Respiratory Care Pharmacology 9th Edition
- K.D. Tripathi, Essentials of Medical Pharmacology, 6th edition, Jaypee brother's medical publishers (P) Ltd
- Lippincott's Illustrated Reviews: Pharmacology (6th edition)
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18

RESPIRATORY THERAPY SCIENCE II

Core : Course
Credit: 03

Theory: 45 hours
Practical: 30 hours

Course Objectives

The course 'Respiratory Therapy Science- II' is designed to deliver comprehensive knowledge to students about Advanced cardiac life support, Airway management, Therapeutics, Patient monitoring and assessment, that a Respiratory therapist are expected to be expertized in.

Topic

1 **Advanced Cardiovascular Life Support**

- Review of Basic Cardiac Life Support
- Review of cardiac electrophysiology
- Cardiac Arrest Rhythms and Management (Shockable and Non shockable)
- Peri Arrest Rhythms- Techy and Brady arrhythmias
- Post Cardiac Arrest Management
- Acute Stroke and management
- Acute coronary Syndrome and management
- Defibrillator- Technical aspect and Clinical application
- Pacer- Technical aspect and clinical application

2 **Airway Management**

- Review of Airway Anatomy
- Airway assessment
 - ✓ Congenital anomalies
 - ✓ Acquired anomalies
 - ✓ Predictors of Difficult airway- Mallam Patti, LEMON, ULBT, TMD
- Advanced Airway Adjuncts

Endotracheal tubes

Double lumen tube

Specialized endotracheal tubes

- Supraglottic Airways
 - Laryngeal Mask Airway and its variants
 - Combitube
 - Laryngeal tubes- King's LT
- Aids to Endotracheal Intubation:-
 - Laryngoscopes- Macintosh and Miller
 - Endotracheal Tube Guide/Intubating Stylet
 - Video laryngoscopy
 - Bronchoscopy guided intubation
- Adjuncts to Endotracheal Intubation:-
 - Lighted Stylets or Light-wand
 - Tube exchanger
 - Bougie
 - Indirect Laryngoscopy
 - Retrograde Wire Intubation
 - Blind Intubation
 - Complications of Intubation
 - Confirmation of definitive airway- ETCO₂, 5 Points, EDD etc.
 - Specialized Endotracheal Tubes
 - Surgical Airway Devices (Indication & Contraindication, Procedure, Complication and Hazard):-
 - Tracheostomy Tubes
 - Cricothyrotomy sets
 - Trans-tracheal catheters
 - Positioning Adjuncts- ET tube holder, TT holder
 - Cuff manometer
 - Extubation and Decannulation

3 **Bronchoscopy**

- Types- Flexible and Rigid
- Parts, physics and principle of flexible bronchoscopes
- Indications, Contraindications, Monitoring and Complications
- Assessment of need and outcome
- Infection control and sterilization of bronchoscopes

4 **Intercostal Drains and Tubes**

- Basic principles of chest tube
- Chest Drainage system- Indications, technical aspects, set up and maintenance
- Troubleshooting

5 **Circulatory Assist Devices**

Extra Corporeal Life Support- ECLS- Types- ECMO, ECCO2R

- Extracorporeal Membrane Oxygenation- ECMO Types, indication, contraindications, complications
- Pump
- Cannula
- Oxygenator
- Circuit
- Sensors

6 **Blood Gas Analyzer**

- Blood gas machine- Calibration and Quality control of blood gas measuring systems
- Blood gas sensor blocks
- POC testing

7 **Respiratory Monitoring**

Principles of Monitoring

Respiratory Monitoring:-

- Oxygen Content Alveolar-Arterial Oxygen Tension Difference, Alveolar gas equation, PaO_2 / FiO_2 Ratio, SpO_2 / FiO_2 Ratio, Oxygenation Index, Oxygen Saturation Index , Respiratory Quotient, V/Q ratio, Quantification of Shunt, Monitoring lung and chest wall resistance, compliance, Minute ventilation- Wright's spirometry, Peak inspiratory and expiratory flow meters- Indication, technique, contraindications

8 **Cardiovascular and Hemodynamic Monitoring**

- Central Venous Pressure, Arterial BP monitoring, Pulmonary Artery Pressure, Cardiac output monitoring

9 **Neurologic Monitoring**

- Conscious levels- Alert, Confused, Lethargic, Obtunded, Stupor, Coma; Glasgow Coma Scale Score; Pupillary Response, Corneal response, Eye movements; Respiratory Rate and Pattern- Abnormal patterns; Intracranial Pressure Monitoring

10 **Assessment and Monitoring of other systems**

Monitoring Renal Function Monitoring Liver Function Nutritional

Monitoring:-

- Assessment of Nutritional Status
- Functional Assessment
- Metabolic Assessment
- Estimating Nutritional Requirements

Course Outcomes:

Upon completion of the course, the student should be able to:

- Understand and perform Advanced cardiac life support
- Understand various therapeutic and technical aspects of Airway management.
- Understand the importance of various systemic monitoring and physiological monitoring.
- Apply the skills required to select the appropriate therapeutic modalities based on patient's need in clinical settings

Recommended books

- Mosby's Respiratory Care Equipment, J.M. Cairo, 10th Edition
- Mechanical Ventilation Physiological and Clinical Application by Susan Pilbeam and Jim Cairo, 7th edition
- Equipment theory for Respiratory care by Gary C. White, 5th Edition
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.

CARDIOPULMONARY DISEASES II

Core: Course

Theory: 30 hours

Credit: 02

Course Objective

This course is a continuation to Cardiopulmonary Disease I designed to teach the respiratory therapy student about the pathological changes, clinical findings and treatment of major cardiopulmonary diseases.

Course Outline

Topic

1. CARDIOVASCULAR DISEASES

Congestive heart failure

1.1 Pathophysiology

1.2 Diagnosis

1.3 Management

2. Valvular Heart Disease

2.1 Mitral and tricuspid Regurgitation

2.2 Mitral and tricuspid stenosis

2.3 Aortic and pulmonary valve Stenosis and Regurgitation

3. Cardiomyopathy, Myocarditis and Endocarditis

3.1 Pathophysiology

3.2 Diagnosis

3.3 Management

4. Cardiac tamponade and Pericarditis

4.1 Pathophysiology

4.2 Diagnosis

4.3 Management

- 5. Cardiothoracic Surgical Conditions and Prolonged Assisted Circulation**
 - 5.1 Indication, Contraindications and Complications
 - 5.2 Pre-operative management
 - 5.3 Post-operative management
 - Thoracotomies, Lung Volume Reduction Surgery (LVRS), Pneumonectomy, Lung Transplantation
 - Coronary Angioplasty, Coronary Artery Bypass Grafting (CABG), Heart Transplantation
 - Principles of Ventricular Assist Device
- 6. Coronary and Peripheral Vascular Disease Hypertension**
 - 6.1 Primary and Secondary hypertension
 - 6.2 Grades of hypertension
 - 6.3 Accelerated hypertension
- 7. Ischemic Heart Disease**
 - 7.1 Myocardial infarction
 - 7.2 Stable and Unstable Angina
 - 7.3 Acute Coronary Syndrome
- 8. Shock: Definition, Classification, Pathophysiology and General management**
 - 8.1 Hypovolemic shock
 - 8.2 Cardiogenic shock
 - 8.3 Obstructive shock
 - 8.4 Distributive shock
- 9. PULMONARY MANIFESTATIONS OF CENTRAL NERVOUS SYSTEM DISEASES**
 - Acute Stroke: Ischemic stroke and Hemorrhagic stroke: Definition, Classification, Risk factors, Management
 - Seizure and Epilepsy
 - Traumatic Brain Injury and Respiratory Manifestations
 - Hypoxemic encephalopathy and Coma

10.

ENVIRONMENTAL AND OCCUPATIONAL DISORDERS

Occupational Disorders

- Asbestos-related lung disease. Coal workers lung disease, Silicosis, Sarcoidosis, Acute and chronic responses to toxic inhalations

Environmental Disorders

- High-altitude physiology and clinical disorders, Diving injuries and air embolism, Acute smoke inhalation injuries-CO Poisoning, Drowning, Electrical safety injuries, Thermal injuries/ Burns, Envenomation
Tetanus

11. **TRAUMA AND MANAGEMENT-**

- **Cervical Spine Injury, stabilization, management**
- **Extremity trauma- Long bone fractures- Fat Embolism**
- **The Deadly Dozen of Chest Trauma and Management**

Immediate Life-Threatening Injuries: Anatomic alteration, Pathophysiology and Management

- Airway obstruction, Tension Pneumothorax, Pericardial Tamponade, Open Pneumothorax, Massive Hemothorax, Flail chest

Potential Life-threatening Injuries: Anatomic alteration, Pathophysiology and Management

- Thoracic aortic disruption, Tracheobronchial injuries, Blunt Myocardial injury, Diaphragmatic Injuries, Oesophageal injury, Pulmonary Contusion

12. **AN INTRODUCTION TO SLEEP DISORDERS-**

CARDIOPULMONARY MANIFESTATIONS

16.1 Obstructive sleep Apnea

16.2 Central sleep Apnea

16.3 Mixed Sleep Apnea

16.4 Sleep-related hypoventilation and hypoxemia syndromes

16.5 Diagnosis of obstructive sleep apnea

Course Outcome:

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

- Enumerate the pathological changes that occurs in the pulmonary system of patients suffering from cardiopulmonary diseases
- Describe and diagnose clinical features and outline the treatment of cardiopulmonary disease
- Appreciate the role of the respiratory therapist in the management and diagnosis of cardiopulmonary disease.

Recommended books

- Mosby's Respiratory Care Equipment, J.M. Cairo, 10th Edition
- Mechanical Ventilation Physiological and Clinical Application by Susan Pilbeam and Jim Cairo, 7th edition
- Equipment theory for Respiratory care by Gary C. White, 5th Edition.
- Murray and Nadel's Textbook of Respiratory Medicine. 6th edition.
- Terry Des Jardins & George G. Burton: Clinical Manifestations and Assessment of Respiratory Disease. 8th edition.
- Harrison's Principles of Internal Medicine. 20th edition.
Michael Grippi: Fishman's Pulmonary Diseases and Disorders. 5th edition
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.

MECHANICAL VENTILATION I

Core: Course
Credit: 03
Course Objectives

Theory: 45 hours
Practical: 30 hours

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 Outline

Topic

- 1. Terminologies and Functional Concepts of Mechanical Ventilation**
 - 1.1. Physiological terms and Concepts related to Mechanical Ventilation
 - 1.2. Normal Mechanics of Spontaneous Ventilation
 - 1.3. Lung Characteristics and Time Constants
 - 1.4. Types of Mechanical Ventilation
 - 1.5. Pressures in Positive Pressure Ventilation
- 2. Technical aspects of Mechanical Ventilator**
 - 2.1. Historical Perspective on Ventilator Classification
 - 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
- 3. Mechanical delivery of a Breath**
 - 3.1. Basic Model of Ventilation in the Lung during Inspiration
 - 3.2. Factors Controlled and Measured During Inspiration
 - 3.3. Overview of Inspiratory Waveform Control
 - 3.4. Phases of a Breath and Phase Variables
 - 3.5. Types of Breaths
 - 3.6. Chatburn's classification- Nomenclature

- 4. Assessing and establishing the need for Mechanical Ventilation**
 - 4.1. Respiratory Failure
 - 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
- 5. Modes of Mechanical Ventilation**
 - 5.1. Modes of Invasive Ventilation
 - 5.2. Modes of Non-invasive ventilation
 - 5.3. Dual and hybrid Modes of Ventilation
- 6. Initial Ventilator Settings**
 - 6.1. Determinants during Volume controlled Ventilation
 - 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
 - 6.8. Overview of Disease specific ventilation- Initial settings
 - Chronic Obstructive Pulmonary Disease, Asthma
 - Neuromuscular Disorders, Closed Head Injury
 - Pneumonia, Acute Respiratory Distress Syndrome, ILD and Cardiogenic Pulmonary Edema
- 7. Patient Assessment on Mechanical Ventilation**
 - 7.1. Documentation/Charting
 - 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

8. Assessment of Respiratory Function

- 8.1. Noninvasive Measurements of Blood Gases
- 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

9. Hemodynamic Monitoring

- 9.1. Review of Cardiovascular Principles
- 9.2. Hemodynamic Measurements
- 9.3. Interpretation of Hemodynamic Profiles
- 9.4. Clinical Applications

10. Sedatives, Analgesics and Muscle Relaxants

- 10.1. Sedatives and Analgesics
- 10.2. Muscle relaxants

11. Noninvasive Positive-Pressure Ventilation

- 11.1. Types of Noninvasive Ventilation Techniques
- 11.2. Indications for Noninvasive Positive-Pressure Ventilation
- 11.3. Patient Selection Criteria
- 11.4. Equipment Selection for Noninvasive Ventilation
- 11.5. Selection of Patient Interface
- 11.6. Setup and Preparation for Noninvasive Ventilation
- 11.7. Monitoring and Adjustment of Noninvasive Ventilation
- 11.8. Aerosol Delivery in Noninvasive Ventilation
- 11.9. Complications of Noninvasive Ventilation
- 11.10. Weaning from and Discontinuing Noninvasive Ventilation

Course Outcome:

- 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.

Recommended books

- Mosby's Respiratory Care Equipment, J.M. Cairo, 10th Edition
- Mechanical Ventilation Physiological and Clinical Application by Susan Pilbeam and Jim Cairo, 7th edition
- Susan Pilbeam and Jim Cairo. Workbook for Mechanical Ventilation Physiological and Clinical Application. 6th edition
- Murray and Nadel's Textbook of Respiratory Medicine. 6th edition.
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.

CLINICAL TRAINING II

**Core: Course
Credit: 4**

Practical + Posting: 330 hours

Course 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.

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

- Practical demonstration for the topics learnt during theory classes
- Clinical postings to enhance clinical skills learnt during practical

SERIAL NO. TOPIC

1. Practicum & demonstration on ACLS procedures
2. Practicum & demonstration on use advanced artificial airways
3. Practicum & demonstration on bronchoscopy
4. Practicum & Demonstration on Chest tube drainage procedures
5. Practicum & Demonstration on Assessment of CVS, CNS and other organ system
6. Practicum on Classification of modes & disease specific mechanical ventilation management
7. Practicum & Demonstration on equipment selection & initiation & weaning of Non-invasive ventilation
8. Practicum & Demonstration on Initiation of Mechanical Ventilation
9. Practicum & Demonstration on maintenance of Mechanical Ventilator & Monitoring of patient on mechanical ventilator.

HUMAN RIGHTS AND GENDER EQUITY

Course: AECC

Number of Hours: 30 Hours

Credits: 02

Course Objectives :

- To make the student understand the human rights as citizens of India.

COURSE CONTENT:

Unit 1: Human Rights (5 Hours)

- Human Rights- Meaning
- Universal declaration of Human rights

Unit 2: Human Rights Advocacy (5 Hours)

- Global Advocacy of human rights amnesty international and other organizations
- People's union for Civil Liberty(PUCL)
- Human Rights Commission in India
- Minority Commission in India
- Remedies against Violation of Human rights in India

Unit 3 : Gender Equity (5 Hours)

- Key Concepts- Gender and sex- Masculinity and Femininity, Patriarchy- Matriarchy, Gender roles and attributes, Gender division or labour, Gender Bias, Gender Stereotypes, Need for Gender Sensitization.

Unit 4: Woman Status in India (5 Hours)

- Important indicators- Sex Ratio, Education, Health, Nutrition, Maternal and Infant Mortality, Work Participation rate, Political Participation.

Unit 5: Contemporary Women's Issues(5 Hours)

- Discrimination against Girl child
- Violence against women

- Problems of health and nutrition
- Women's education gender bias in education
- Trafficking in Women
- Globalization and Impact on Women

Unit 6: State Initiatives on Gender Issues(5 Hours)

- Constitutional Rights of Women
- Laws Pertaining to Women
- The National Commission for Women

Course Outcome:

- Basic Knowledge of Human Rights and its function and authorities in society and industry women's status, issues and gender equity.

Recommended Books:

1. Parvathy Appaiah, Human Rights, Gender Equity and Environmental Studies, Shivam Books publishers, 2012.
2. Parvathy Appaiah, Human Rights, Gender Equity and Environmental Studies, Jai Bharath Prakashan publishers, 2016.

Parvathy Appaiah, Human Rights, Gender Equity and Environmental Studies, Jai Bharath Prakashan publishers, 2018-19.

BIOSTATISTICS

Course: AECC

Credit: 02

Number of Hours: 30

Course Objectives :

- Understands statistical terms.
- Possesses knowledge and skill in the use of basic statistical methods.

COURSE CONTENT:

Unit 1: Introduction (3 hours)

- Meaning, definition of statistics.
- Importance of the study of statistics.
- Branches of statistics.
- Statistics and health science including nursing.
- Parameters and estimates.
- Descriptive and inferential statistics.
- Variables and their types.
- Measurement scales

Unit 2 :Tabulation of Data

(3 hours)

- Raw data, the array, frequency distribution
- Basic principles of graphical representation
- Types of diagrams - histograms, frequency polygons, smooth frequency polygon, commulative frequency curve, ogive.
- Normal probability curve.

Unit 3: Measure of Central Tendency (4 hours)

- Need for measures of central tendency
- Definition and calculation of mean - ungrouped and grouped
- Meaning, interpretation and calculation of median ungrouped and grouped
- Meaning and calculation of mode.
- Comparison of the mean, and mode.

Unit 4: Measure of Variability (6 hours)

- Need for measure of dispersion. The range, the average deviation.
- The variance and standard deviation.
- Calculation of variance and standard deviation ungrouped and grouped.
- Properties and uses of variance

Unit 5: Probability and Standard Distributions(6 hours)

- Meaning of probability of standard distribution.
- The Binominal distribution.
- The normal distribution.
- Divergence from normality - skewness, kurtosis.

Unit 6:Sampling Techniques(5 hours)

- Need for sampling - Criteria for good samples.
- Various sampling designs.
- Procedures of sampling and sampling designs errors.
- Sampling variation.
- Tests of significance.

Unit 7: Health Indicator (3 hours)

- Importance of health Indicator.
- Indicators of population, morbidity, mortality, health services.
- Calculation of rates and rations of health.

Course Outcomes

- Gains Knowledge in application of statistics in medical field and research.
- Possesses knowledge and skill in the use of basic statistical methods.

Recommended Books.

1. Mahajan BK, Gupta MC. Textbook of preventive and social medicine. Jaypee Brothers; 1995.

FIFTH SEMESTER

PULMONARY FUNCTION TESTS AND IMAGING

Core: Course
Credit: 04

Theory: 45 hours
Practical: 30 hours

Course Objectives

This course deals with the diagnostic side of lung diseases through measuring lungs functions. The students will learn how to conduct, diagnose and analyze lung function tests. Students will also learn about various imaging tools relevant for thoracic imaging like chest x-ray, Ultrasound, Basics of CT scan and MRI Scan of Chest

Course Outline

Topic

1. INTRODUCTION TO PULMONARY FUNCTION TESTING

Types and Indications

- 1.1. Airway function tests
- 1.2. Lung volume and ventilation tests
- 1.3. Diffusing capacity tests
- 1.4. Blood gases and gas exchange tests
- 1.5. Cardiopulmonary exercise tests
- 1.6. Metabolic measurements

Preliminaries to Patient Testing

- Patient preparation
- Physical assessment
- Pulmonary history

Test Performance and Sequence

- Technologist-driven protocols
- Patient instruction

2. PULMONARY FUNCTION TESTING EQUIPMENT

Volume-Displacement Spirometers

- 2.1. Water-seal spirometers
- 2.2. Dry rolling seal spirometers
- 2.3. Bellows-type spirometers

Flow-Sensing Spirometers

- 2.4. Turbines
- 2.5. Pressure differential flow sensors
- 2.6. Heated-wire flow sensors
- 2.7. Pitot tube flow sensors
- 2.8. Ultrasonic flow sensors
- 2.9. Flow sensor summary
- 2.10. Portable (office)
spirometers

Peak Flowmeters

Body Plethysmographs

- 2.11. Pressure
plethysmographs
- 2.12. Flow
plethysmographs

Breathing Valves

- 2.13. Free breathing and demand
valves
- 2.14. Directional valves
- 2.15. Gas-sampling valves

Pulmonary Gas Analyzers

Computers for Pulmonary Function Testing

- 2.16. Data acquisition and instrument control
Pulmonary function data
storage and programs

3. SPIROMETRY:

Description, Technique, Significance and Pathophysiology Acceptability and Repeatability for Spirometry Results

- 3.1. Vital Capacity
- 3.2. Forced Vital Capacity, Forced Expiratory Volume, and Forced Expiratory
Flow

- 3.3. Flow-Volume Curve
- 3.4. Peak expiratory flow
- 3.5. Maximum Voluntary Ventilation
- 3.6. Before- and After-Bronchodilator Studies

4. DIFFUSION CAPACITY TESTS

Diffusion Capacity of Lung for Carbon Monoxide (DLCO) or Transfer Factor of Lung for Carbon Monoxide (TLCO)

- 4.1. Techniques
- 4.2. Description
- 4.3. Significance and pathophysiology**

5. LUNG VOLUMES, AIRWAY RESISTANCE AND GAS DISTRIBUTION TESTS

Lung Volumes: Functional Residual Capacity, Residual Volume, Total Lung Capacity, and Residual Volume/Total Lung Capacity Ratio

- 5.1. Description
- 5.2. Technique
- 5.3. Significance and pathophysiology

Airway Resistance and Conductance (Body plethysmograph)

- 5.4. Description
- 5.5. Technique
- 5.6. Significance and pathophysiology

Gas Distribution Tests: Single-Breath Nitrogen Washout, Closing Volume, and Closing Capacity

- 5.7. Description
- 5.8. Technique

6. CARDIOPULMONARY EXERCISE TESTING

Exercise

Protocols

Exercise

Workload

Cardiovascular Monitors During

Exercise Ventilation During

Exercise

- 6.1. Equipment selection and calibration
- 6.2. Minute ventilation
- 6.3. Tidal volume and respiratory rate
- 6.4. Flow-volume loop analysis

Oxygen Consumption, Carbon Dioxide Production, and Respiratory Exchange Ratio During Exercise

- 6.5. Oxygen consumption
- 6.6. Carbon dioxide production
- 6.7. Respiratory exchange ratio
- 6.8. Anaerobic or ventilatory threshold
- 6.9. Ventilatory equivalent for oxygen
- 6.10. Ventilatory equivalent for carbon dioxide
- 6.11. Oxygen pulse

Exercise Blood Gases

- 6.12. Arterial oxygen tension during exercise
- 6.13. Arterial carbon dioxide tension during exercise
- 6.14. Acid-base status during exercise
- 6.15. Exercise variables calculated from blood gases

Cardiac Output During Exercise

- 6.16. Noninvasive cardiac output techniques
- 6.17. Direct Fick method
- 6.18. Thermodilution method
- 6.19. Cardiac output during exercise
- 6.20. Symptoms scales
- 6.21. Quality of test
- 6.22. Interpretation strategies

7. BRONCHIAL PROVOCATION TESTS

Bronchial provocation challenge testing: Indications, Contraindications, Technique and Complications

- 7.1. Methacholine Challenge
- 7.2. Histamine Challenge
- 7.3. Mannitol Challenge
- 7.4. Exercise Challenge
- 7.5. Eucapnia Voluntary Hyperventilation

8. SPECIALIZED PULMONARY FUNCTION TEST REGIMENS AND QUALITY MARKERS

Respiratory Muscle Strength Testing: Description, Techniques, Significance and Pathophysiology

Forced Oscillation – Impulse Oscillometry Preoperative Pulmonary Function Testing Pulmonary Function Testing for Disability

- 8.1. Forced vital capacity and forced expiratory volume
- 8.2. Diffusing capacity
- 8.3. Exercise testing

Metabolic Measurements: Indirect Calorimetry: Description, Techniques, Significance and Pathophysiology

Quality System Essentials

- Organization, Facilities and safety Personnel, Process management, Spirometry calibration and mechanical quality control, Gas analyzers, Calibration and quality control

9. IMAGING

Chest Radiology- Review

- ✓ Identify the radiographic landmarks on a Chest X ray
- ✓ Outline an approach to interpretation and quality of frontal or lateral CXR
- ✓ Recognize common abnormalities
- ✓ Recognize normal and abnormal placement of invasive airways, chest tubes and lines

Basics of Computed Tomography of Chest

- Basic physics, principles, technical and safety aspects
- CT Chest Anatomy
- Types- Standard, High resolution, CT Angiography.
- Windows- Lung, Mediastinal and Bone
- Indications, Contraindications
- Preparation and safety of Ventilated patient, for CT Scan
- Basic CT Interpretation

Basics of Magnetic Resonance Imaging of Thorax

- Basic physics, principles, technical and safety aspects
- MRI Chest Anatomy
- Indications, Contraindications
- Preparation and safety of ventilated patient for MRI Scan
- Basic interpretation

Ultrasonography

- Physics
- Machine and Modes
- Knobology and technical specifications
- Lung Ultrasound- Normal and abnormal signs
- Airway Ultrasound- Normal and abnormal signs
- Diaphragmatic Ultrasound- Normal signs, diaphragmatic thickness and excursion- decision making in respiratory care
- Infection control practices in ICU sonology

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

- Identify all common pulmonary function testing lab equipment's
- Explain the methods for performing quality control of PFT system
- Perform spirometry, DLCO tests
- Perform body plethysmography and bronchial provocation tests
- Interpret thoracic imaging like Chest X ray, CT Chest
- Perform and interpret Lung, Airway and Diaphragmatic ultrasound
- To assess the validity of all of the above-mentioned tests
- Analyze and interpret all the above-mentioned tests.

Recommended books

- Madama, Vincent C. Pulmonary Function Testing and Cardiopulmonary Stress Testing. 2nd edition
- Ruppel, Gregg L. Manual of Pulmonary Function Testing. 11th edition Murray and Nadel's Textbook of Respiratory Medicine.7th edition.
- Textbook of Radiology for CT and MRI Technicians with MCQs
- ISCCM Manual for Critical care ultrasound.
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.

MECHANICAL VENTILATION II

Core: Course
Credit: 4

Theory: 30 hours
Practical: 30 hours

Course Objectives

This course is designed to build the knowledge for Respiratory Therapy students, about disease specific ventilation strategies and also, teaches different weaning strategies from ventilation and its effect on various organ systems.

Course Outline

Topic

- 1. Disease Specific Ventilation Strategies**
 - 1.1. Chronic Obstructive Pulmonary Diseases, Asthma
 - 1.2. Neuromuscular Disorders, Closed Head Injury
 - 1.3. Pneumonia, Acute Respiratory Distress Syndrome, Pulmonary Edema
ILD
- 2. Ventilator Graphics**
 - 2.1. Relationship of Flow, Pressure, Volume, and Time
 - 2.2. Scalars, Curves, and Loops
 - 2.3. Assessment of Pulmonary Mechanics
 - 2.4. Assessing Patient-Ventilator Asynchrony
 - 2.5. Advanced Applications
- 3. Patient-Ventilator Management Strategies**
 - 3.1. Troubleshooting Ventilation Abnormalities
 - 3.2. Common Methods of Changing Ventilation Based on PaCO₂ and pH
 - 3.3. Metabolic Acidosis and Alkalosis
 - 3.4. Mixed Acid–Base Disturbances
 - 3.5. Increased Physiological Dead Space
 - 3.6. Increased Metabolism and Increased Carbon Dioxide Production
 - 3.7. Intentional Iatrogenic Hyperventilation
 - 3.8. Permissive Hypercapnia
 - 3.9. Airway Clearance during Mechanical Ventilation
 - 3.10. Secretion Clearance from an Artificial Airway

- 3.11. Administering Aerosols to Ventilated Patients
- 3.12. Postural Drainage and Chest Percussion
- 3.13. Flexible Fiberoptic Bronchoscopy
- 3.14. Additional Patient Management Techniques and Therapies in Ventilated Patients
 - Sputum and Upper Airway Infections
 - Fluid Balance
 - Psychological and Sleep Status
 - Patient Safety and Comfort
 - Transport of Mechanically Ventilated Patients within an Acute Care Facility

4. Acute Respiratory Distress Syndrome and Mechanical Ventilation

- 4.1. Acute Respiratory Distress Syndrome
- 4.2. Pathophysiology- The inflammatory Cascade
- 4.3. Changes in Computed Tomogram with ARDS
- 4.4. Lung-Protective Strategies: Setting Tidal Volume and Pressures in ARDS
- 4.5. Long-Term Follow-Up on ARDS
- 4.6. Pressure–Volume Loops in ARDS
- 4.7. Recruitment Maneuvers in ARDS
- 4.8. Prone ventilation
- 4.9. The Importance of Body Position during Positive Pressure Ventilation
- 4.10. Basics of Oxygenation using FIO₂, PEEP Studies, and Pressure–Volume Curves for establishing
- 4.11. Basics of Oxygen Delivery to the Tissues
- 4.12. Positive End-Expiratory Pressure and Continuous Positive Airway Pressure
 - PEEP Ranges
 - Indications for PEEP and CPAP
 - Initiating PEEP Therapy
 - Identifying Optimum PEEP
 - Use of Pulmonary Vascular Pressure Monitoring with PEEP

- Contraindications and Physiological Effects of PEEP
- Weaning From PEEP

5. Extra-pulmonary Effects of Mechanical Ventilation

- 5.1. Effects of Positive-Pressure Ventilation on Heart and the great vessels
- 5.2. Adverse Cardiovascular Effects of Positive-Pressure Ventilation
- 5.3. Factors Influencing Cardiovascular Effects of Positive-Pressure Ventilation
- 5.4. Beneficial Effects of Positive-Pressure Ventilation on Heart Function in Patients with Left Ventricular Dysfunction
- 5.5. Physiological Effects and Complications of Mechanical Ventilation
- 5.6. Effects of Mechanical Ventilation on Intracranial Pressure, Renal Function, Liver Function, and Gastrointestinal Function
- 5.7. Effects of Mechanical Ventilation on Intracranial Pressure and Cerebral Perfusion
- 5.8. Renal Effects of Mechanical Ventilation
- 5.9. Effects of Mechanical Ventilation on Liver and Gastrointestinal Function
- 5.10. Nutritional Complications during Mechanical Ventilation

6. Effects of Positive-Pressure Ventilation on the Pulmonary System

- 6.1. Lung Injury with Mechanical Ventilation
- 6.2. Effects of Mechanical Ventilation on Gas Distribution and Pulmonary Blood Flow
- 6.3. Respiratory and Metabolic Acid–Base Status in Mechanical Ventilation
- 6.4. Air Trapping (Auto-PEEP)
- 6.5. Hazards of Oxygen Therapy with Mechanical Ventilation
- 6.6. Increased Work of Breathing
- 6.7. Ventilator- Mechanical and Operational Hazards
- 6.8. Complications of the Artificial Airway

7. Ventilator-Associated Events

- 7.1. Epidemiology
- 7.2. Ventilator associated infections- Ventilator-Associated Pneumonia, Types
- 7.3. Pathogenesis of Ventilator-Associated Pneumonia
- 7.4. Diagnosis of Ventilator-Associated Pneumonia
- 7.5. Treatment of Ventilator-Associated Pneumonia
- 7.6. Strategies to Prevent Ventilator-Associated Pneumonia

8. Troubleshooting during Mechanical Ventilation

- 8.1. Identifying the Patient in Sudden Distress
- 8.2. Patient-Related Problems
- 8.3. Ventilator-Related Problems
- 8.4. Common Alarm Situations
- 8.5. Use of Graphics to Identify Ventilator Problems

9. Liberation and Discontinuation from Mechanical Ventilation

- 9.1. Liberation/ Weaning Techniques
- 9.2. Titration of ventilation during Weaning
- 9.3. Closed-Loop Weaning
- 9.4. Evaluation of Clinical Criteria for Weaning
- 9.5. Pathology of Ventilator Dependence
- 9.6. Assessment of weaning readiness
- 9.7. Assessment during a Spontaneous Breathing Trial
- 9.8. Spontaneous Breathing Trial Failure
- 9.9. Non-respiratory Factors That May Complicate Weaning
- 9.10. Sedation Strategies and Protocols
- 9.11. Weaning Protocols
- 9.12. Extubation- Readiness criteria and techniques
- 9.13. Extubation failure and Reintubation criteria
- 9.14. Role of Tracheostomy in Weaning
- 9.15. Long-Term Care Facilities for Patients Requiring Prolonged Ventilation
- 9.16. Weaning in Long-Term Ventilation Units
- 9.17. Weaning from Non-invasive ventilation
- 9.18. Withholding and Withdrawing Ventilator Support

10. Long-Term Ventilation

- 10.1.Goals of Long-Term Mechanical Ventilation and Patient Selection
- 10.2.Preparation for Discharge to the Home
- 10.3.Equipment Selection for Home Ventilation
- 10.4.Complications of Long-Term Positive Pressure Ventilation
- 10.5.Expiratory Muscle Aids and Secretion Clearance
- 10.6.Tracheostomy Tubes, Speaking Valves, and Tracheal Buttons
- 10.7.Ancillary Equipment and Equipment Cleaning for Home Mechanical Ventilation

11. Advances and Adjuncts in Mechanical Ventilation

- 11.1.Airway Pressure Release Ventilation
- 11.2.High-Frequency Oscillatory Ventilation: Technical Aspects, Initial Settings, Indication and Exclusion Criteria, Monitoring, Assessment, and Adjustment
- 11.3.Liquid Ventilation
- 11.4.Advanced technologies like Automatic Tube Compensation, Closed loop weaning, Intelligent ventilation
- 11.5.Advanced modes like Adaptive Support Ventilation, Pressure Regulated Volume Control, Proportional Assist Ventilation, Volume Support Ventilation
- 11.6.Anesthesia machine- Components and working principles
- 11.7.Heliox Therapy: Gas Flow through the Airways, indications, complications, Devices
- 11.8.Inhaled Nitric Oxide: Technical Aspects, Initial Settings, Indication and Exclusion Criteria, Monitoring, Assessment, and Adjustment
- 11.9. Neurally Adjusted Ventilatory Assist- Adjuncts
- 11.10. Monitoring the Electrical Activity of the Diaphragm
- 11.11. Diaphragm Electrical Activity Monitoring
- 11.12. Diaphragmatic pacemaker

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

- Describe ventilation approaches for various diseases.
- Explain the effect of mechanical ventilation on pulmonary and extra pulmonary system
- Describe the concept of Long-term Ventilation
- Identify the normal and abnormal ventilator graphics
- Select appropriate weaning criteria for ventilated patients
- Identify and troubleshoot ventilator and patient related problems.

Recommended books

- Mosby's Respiratory Care Equipment, J.M. Cairo, 10th Edition
- Mechanical Ventilation Physiological and Clinical Application by Susan Pilbeam and Jim Cairo, 7th edition
- Susan Pilbeam and Jim Cairo. Workbook for Mechanical Ventilation Physiological and Clinical Application. 6th edition
- Murray and Nadel's Textbook of Respiratory Medicine. 6th edition.
- Vijay Deshpande, T.R Chandershekhar. Mechanical Ventilation: Clinical Application 2nd edn.
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.

ESSENTIALS OF CRITICAL CARE

Core: Course
Credit: 03

Theory: 30 hours

Course Objective: This course is intended to introduce principles of critical care and the importance of the initial care of critically ill/injured patients to the Respiratory Therapy Students, who upon their graduation will spend most of their time in ICU settings.

Course Outline

- Topic**
- 1. Assessment of Critically Ill**
 - 1.1. Subjective and Objective Patient Assessment
 - 1.2. Neurological Assessment
 - 1.3. Respiratory Assessment
 - 1.4. Cardiovascular and Circulatory Assessment including Hemodynamics
 - 1.5. GI Assessment
 - 2. Monitoring in Critical Care**
 - 2.1. Waveform monitoring- CVP, Arterial line, TCM, PAP, SpO₂, ETCO₂, ECG, Cardiac output monitoring, Thermo-dilution methods
 - 2.2. Bundles of Care in ICU- VAP bundle, Vascular bundle, Sepsis bundle, FAST
 - 3. Diagnostic Tests in Critical Care**
 - 3.1. Imaging in ICU like Chest X-rays, Ultrasonography, Echocardiography
 - 3.2. Chest CT- types and abnormal findings
 - 3.3. Laboratory interpretations, that include hematology, microbiology, biochemistry and pathology reports
 - 4. Resuscitation in ICU**
 - 4.1. Advanced Resuscitation in ICU
 - 4.2. Post cardiac arrest care
 - 4.3. Targeted temperature management
 - 4.4. Extracorporeal CPR
 - 5. Acute Respiratory Failure, Mechanical Ventilation and other Adjuncts**
 - 5.1. Types of Respiratory Failure, Clinical manifestations, Diagnosis, Pathophysiology, Pharmacological adjuncts and

other aspects management

- 5.2. Disease specific noninvasive ventilation strategies and HFNC
- 5.3. Disease specific invasive ventilation strategies and hybrid modes
- 5.4. ECLS including VV-ECMO, VA-ECMO, ECCO2R- Indications, types of cannula, monitoring, troubleshooting, weaning and decannulation

6. Oxygenation, Circulation and Acid-Base Disorders

- 6.1. Principles of Oxygen therapy- Oxygen cascade, Oxygen content in blood, Cardiac output
- 6.2. Oxygen balance- Global perfusion, ODC, SAO₂, SVO₂, SCVO₂
- 6.3. Determinants of Oxygen balance- Oxyhemoglobin saturation, Central venous pressure, NIBP, Arterial BP and waveforms, Lactate, SCVO₂
- 6.4. Acid base disorders- Acute and Chronic Respiratory Acidosis and Alkalosis, Acute and Chronic Metabolic Acidosis and Alkalosis, Compensatory Mechanisms, Anion gap, Differential diagnosis etc.

7. Circulatory impairments

- 7.1. Clinical features, mechanism and pathophysiology of different types of shock.
- 7.2. Systemic changes in warm and cold shock
- 7.3. Fluid resuscitation and responsive assessment in shock- PLR, IVC Collapsibility, SBP variation, SVR etc.

8. Basics of Neuro and Neurosurgical Care

- 8.1. Ischemic and hemorrhagic stroke- ICU management
- 8.2. Intracranial Pressure and Cerebral perfusion pressure and its importance
- 8.3. Brain protective ventilation strategy
- 8.4. Brain death and apnea tests

9. ICU Pharmacology

- 9.1. Antiarrhythmics, Anticoagulants and thrombolytics
- 9.2. Inotropes and other vasoactive drugs
- 9.3. Analgesics and Sedatives- Classification and indications
- 9.4. Skeletal muscle relaxants- Classification and indications
- 9.5. Sedation Scale: Richmond Agitation-Sedation Scale (RASS), Ramsay's Sedation Scale

10. Common ICU scenarios and management

- 10.1. Sepsis- Definition, Stages, Resuscitation and Management guidelines
- 10.2. Inter and Intra hospital transport of Ventilated patients- Checklist, Assessment, Preparation, Troubleshooting and Stabilization
- 10.3. Pulmonary Embolism
- 10.4. Life threatening electrolyte disturbances
- 10.5. GI Bleed
- 10.6. Acute pancreatitis
- 10.7. Hepato-pulmonary Syndrome
- 10.8. OP Poisoning
- 10.9. Leptospirosis, Malaria, Dengue
- 10.10. Obstetric Hypertensive disorders- Eclampsia, Pre-eclampsia
- 10.11. Amniotic Fluid Embolism

11. Common ICU Procedures

- 11.1. Oral and Nasal Endotracheal Intubation- Indication, Contraindication, Complications
- 11.2. Percutaneous Tracheostomy- Indication, Contraindication, Complications
- 11.3. Arterial Line Insertion- Indication, Sites, Contraindication, Complications
- 11.4. Central Line Insertion- Indication, Sites, Contraindication, Complications
- 11.5. Needle Thoracocentesis- Site, Indication, Contraindication, Complications
- 11.6. Intercostal Drainage insertion- Indication, Site, Contraindication and Complications
- 11.7. Bronchoscopy- Indication, Contraindication, Complications

12. Ethics in Critical Care Medicine

- 13.1. Do Not Attempt Resuscitate Scenarios and End of the Life Care
- 13.2. Organ donation

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

- Explain the initial and ongoing assessment of critically ill or injured patients.
- Understand common ICU cases, disease presentation and the disease process
- Identify and understand diagnostic tests that are commonly used in ICUs, that includes imaging and laboratory tests.
- Evaluate the findings of assessment and interpret abnormal physiological parameters and observations to identify patients who are likely to have a critical physiological decline.
- Assist and be the part of ICU team, in dealing with sudden deterioration of the critically ill patient
- Develop and integrate clinical skills and academic knowledge in order to practice advanced assessment, life support and therapeutic skills, within the scope of practice.
- Prepare equipment and devices related to cardiorespiratory support and airway management in emergency and elective scenarios
- Act as a patient advocate, when it comes to patient safety and quality assurance in the caring of critically ill patients.
- Engage in the delivery of high-quality evidence based multidisciplinary care as either a team member or team leader, upon the crisis scenarios.

Recommended books

- Mosby's Respiratory Care Equipment, J.M. Cairo, 10th Edition
- Mechanical Ventilation Physiological and Clinical Application by Susan Pilbeam and Jim Cairo, 7th edition
- Susan Pilbeam and Jim Cairo. Workbook for Mechanical Ventilation Physiological and Clinical Application. 6th edition.
- Oh's Intensive Care manual, 7th Edition
- Irwin and Rippe's Manual of Intensive care medicine, 6th edition
- Paul Marino's The ICU Book, 3rd Edition
- Vijay Deshpande, T.R Chandershekhar. Mechanical Ventilation: Clinical Application 2nd edn.
- Kacmarek RM, Stoller JK, Heuer A. Egan's Fundamentals of Respiratory Care E-Book. Elsevier Health Sciences; 2019 Dec 18.

CLINICAL TRAINING - III

Core : Course

Practical: 330 hours

Credit: 04

Course Objective : This course will provide a practical and demonstrative approach about BLS, ACLS, initiation and weaning of mechanical ventilation.

It comprises of clinical postings and practicum and demonstration classes.

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

- Practical demonstration for the topics learnt during theory classes

TOPICS

1. Practicum on Pulmonary Function tests includes Spirometry, DLCO, body plethysmography and bronchial provocation tests
2. Practicum on technical aspects and interpretation of Chest X-ray, CT chest, lung ultrasound.
3. Practicum: on modes of ventilation and clinical demonstration
4. Practicum on acute respiratory failure and the need for ventilatory support.
5. Practicum and case presentation on criteria for tracheal intubation and Initiation of ventilatory support
6. Practicum and case discussion on weaning patient from mechanical ventilation
7. Practicum on analysis and troubleshooting of ventilatory graphics
8. Practicum and case discussion on troubleshooting of ventilatory alarms

SIXTH SEMESTER

NEONATAL AND PEDIATRIC RESPIRATORY CARE

Core: Course
Credit: 04

Theory: 30 hours
Practical: 30 hours

Course Objectives

This course is an introduction to the respiratory therapy student on the Neonatal and Pediatric respiratory physiology and mechanics and management of cardiopulmonary disorders.

Course Outline

Topic

1. Development Of Respiratory

System Fetal development

- 1.1. Fetal lung development
- 1.2. Fetal gas exchange and circulation
- 1.3. Surfactant Production and Metabolism
- 1.4. Composition of Surfactant
- 1.5. Functions of Surfactant
- 1.6. Artificial Surfactant- Semi-Synthetic & Synthetic

Postnatal development

- 1.7. Transition from intrauterine to extrauterine life Post-natal lung development

2. General Examination and assessment of a child

- 2.1. Physical examination
- 2.2. Airway and thoracic radiographic assessment

Examination and assessment of the neonatal patients

- 2.3. Gestational age and size assessment
- 2.4. Physical examination of the neonate
- 2.5. Neurological assessment
- 2.6. Pulmonary examination
- 2.7. Non pulmonary examination
- 2.8. Laboratory assessment
- 2.9. Radiographic chest assessment

3. Pediatric Respiratory disorder

- 3.1. Airway disorder
- 3.2. Pediatric lung and related disorders
- 3.3. Surgical disorders in childhood that requires respiratory care
- 3.4. Heart Failure

Neonatal Pulmonary Disorders

- 3.5. Respiratory distress syndrome
- 3.6. Meconium aspiration syndrome
- 3.7. Neonatal pneumonia
- 3.8. Apnea of prematurity
- 3.9. Transient Tachypnea of the neonate
- 3.10. Bronchopulmonary dysplasia

Surgical Disorders of newborn

- 3.11. Choanal atresia, Cleft Palate
- 3.12. Congenital diaphragmatic hernia
- 3.13. Tracheoesophageal fistula

Congenital cardiac defects

- 3.14. Cyanotic and A cyanotic cardiac diseases

4. Pediatric Resuscitation

- 5.1. Systematic approach to the seriously ill or injured child
- 5.2. Recognition of respiratory distress and failure
- 5.3. Management of respiratory distress and failure
- 5.4. Recognition and Management of shock
- 5.5. Recognition and management of arrhythmia's
- 5.6. Recognition and management of cardiac arrest
- 5.7. Post resuscitation management

5. Neonatal Resuscitation

- 2.1. Preparation for resuscitation
- 2.2. Initial steps of newborn care
- 2.3. Positive-pressure ventilation
- 2.4. Chest compression
- 2.5. Medication
- 2.6. Post Resuscitation care
- 2.7. Thermoregulation

6. THERAPEUTIC APPROACHES IN TREATMENT FOR NEONATAL AND PEDIATRIC DISORDERS

Oxygen therapy

- 9.1. Assessment of need
- 9.2. Targeted saturation in newborns
- 9.3. Complications
- 9.4. Delivery devices
- 9.5. Heated humidified high flow nasal cannula (HHHFNC)

7. Surfactant Replacement Therapy

- 10.1. Need for surfactant therapy
- 10.2. Techniques of surfactant delivery- Early/late rescue, INSURE, MIST, LISA
- 10.3. Types of surfactants
- 10.4. Assessment of the outcome

8. Non-Invasive Mechanical Ventilation of Newborns

- 11.1. Continuous Positive airway pressure (CPAP)
- 11.2. Non-invasive Positive pressure ventilation (NIPPV)
- 11.3. Interfaces selection and fit
- 11.4. Indications, contraindications and complications of NIV
- 11.5. Physiological effects
- 11.6. Monitoring the patient and ventilator circuit

9. Invasive mechanical ventilation of newborns

- 12.1. Indications and contraindications of invasive ventilation
- 12.2. Types of mechanical ventilation
- 12.3. Modes of Ventilation
- 12.4. Improvement of oxygenation and ventilation - adjustments of ventilator setting
- 12.5. Weaning and Extubation

10. Unconventional modes of Ventilation

- 13.1. High Frequency ventilation
- 13.2. Nitric oxide therapy
- 13.3. Extracorporeal membrane oxygenation

11. Pediatric Home Care

- 12.1 Oxygen therapy at home
- 12.2 Tracheostomy management
- Home mechanical ventilation

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

- Describe about the fetal lung development and the gas exchange
- To train the student about neonatal resuscitation guidelines.
- Perform the assessment and monitoring of the neonatal patient.
- Differentiate and describe pathophysiology, salient features and treatment of major neonatal disorders.
- Differentiate the anatomic and physiological differences between adult and child.
- Perform initial assessment of a pediatric patient at bedside
- Describe the pathophysiology, salient features and treatment of pediatric cardiopulmonary disorders.

Recommended books

- Mosby's Respiratory Care Equipment, J.M. Cairo, 10th Edition
- Mechanical Ventilation Physiological and Clinical Application by Susan Pilbeam and Jim Cairo, 7th edition
- John P. Cloherty, Manual of Neonatal Care, Lippincott Williams and Wilkins. 8th edition
- Goldsmith Karotkin, Assisted ventilation of the neonate, Elsevier Saunders
- Meharban Singh, Care of the newborn, Eighth edition

CARDIOPULMONARY REHABILITATION AND HOME CARE

Core: Course
Credit: 04

Theory: 30 hours
Practical: 30 hours

Course Objective

This course provides important aspect of managing chronic pulmonary diseases. The course deals with historical perspective, basic concepts, family education and home care as a part of pulmonary rehabilitation.

Course Outline

Topic

- 1. OVERVIEW OF PULMONARY REHABILITATION**
 - 1.1 Definition, Rationale for Pulmonary Rehabilitation
 - 1.2 Pulmonary Rehabilitation and Integrated Care of the Respiratory Patient
 - 1.3 History of Pulmonary Rehabilitation
 - 1.4 Evidence-Based Guidelines on Pulmonary Rehabilitation
 - 1.5 Positioning Pulmonary Rehabilitation within the GOLD 2017 Guidelines
 - 1.6 Current status of Pulmonary Rehabilitation
- 2. SELECTING AND ASSESSING THE PULMONARY REHABILITATION CANDIDATE**
 - 2.1 Patient Selection
 - 2.2 Patient Assessment

3. EXERCISE ASSESSMENT AND TRAINING

- 3.1 Rationale for Exercise Training in Chronic Lung Disease
- 3.2 Mechanisms of Exercise Intolerance in Chronic Respiratory Disease
- 3.3 Exercise Assessment, Field Tests (Walking Tests)
- 3.4 Graded Exercise Test and Cardiopulmonary Exercise Tests
- 3.5 Functional Performance Assessment
- 3.6 Exercise Prescription
- 3.7 Oxygen Titration
- 3.8 Volume, Pattern and Progression of Exercise Training
- 3.9 Resistance Exercise Testing
- 3.10 Other Tests of Muscular Training
- 3.11 Flexibility Training
- 3.12 Patient Safety
- 3.13 Precautions in Pulmonary Hypertension
- 3.14 Exercise Induced Hypoxemia
- 3.15 Home exercise Considerations
- 3.16 Emergency Procedures
- 3.17 Documentation of the Evaluation and Treatment Session

4. COLLABORATIVE SELF MANAGEMENT AND PATIENT EDUCATION

- 4.1 Developing an Individualized Self-Management Program
- 4.2 Implementing Self-Management Training

5. PSYCHOSOCIAL ASSESSMENT AND INTERVENTION

- 5.1 Assessment of Psychosocial Functioning
- 5.2 Interventions to Improve Psychosocial Functioning
- 5.3 Psychosocial Provider

- 6. NUTRITIONAL ASSESSMENT AND INTERVENTION**
 - 6.1 Compromised Nutritional Status in Pulmonary Disease
 - 6.2 Diet Intake and COPD
 - 6.3 Assessment of Nutritional Status
 - 6.4 Nutrition Support
- 7. PATIENT CENTERED EVIDENCE BASED OUTCOMES**
 - 7.1 Timing and Analyzing Outcomes
 - 7.2 Patient Centered Outcome Measures
- 8. DISEASE SPECIFIC APPROACHES IN PULMONARY REHABILITATION**
 - 8.1 Obstructive Lung Disease
 - 8.2 Restrictive Lung Disease
 - 8.3 Pulmonary Hypertension
 - 8.4 Lung cancer
 - 8.5 Pulmonary Rehabilitation and the Surgical Patient
- 9. PROGRAM MANAGEMENT**
 - 9.1 Interdisciplinary Team
 - 9.2 Program content
 - 9.3 Administrative aspects of Program management
 - 9.4 Post rehabilitation Maintenance
 - 9.5 Strategies for Program success
- 10. PERFORMANCE MEASURES, OUTCOMES, VALID AND RELIABLE TOOLS**
 - 10.1 Measuring the Quality of Patient Care
 - 10.2 AACVPR Outpatient Pulmonary Rehabilitation Registry

11. HOME CARE PATIENT ASSESSMENT

11.1 The Evolution and Importance of Respiratory Home Care

11.2 The Home Care Patient

11.3 Home Care Assessment Tools and Resources

11.4 Role and Qualifications of the Home Care

11.5 Respiratory Therapist Role

11.6 Assessment and the Home Visit

11.7 Initial Visit and Assessment

11.8 Home Care Equipment

11.9 Patient Education and Training

11.10 Plan of Care

11.11 Follow-Up Care

11.12 Discharging the Patient

Course Outcome:

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

1. Describe the historical perspective of pulmonary rehabilitation.
2. Explain the basic concepts of pulmonary rehabilitation.
3. Select and assess the chronic respiratory disease patients for pulmonary rehabilitation and family education.
4. Discuss on nutritional assessment and support.
5. Explain the behavioral medicine psychological, cognitive and social factors in pulmonary rehabilitation.
6. Enumerate the preventive aspects for the patient with chronic lung disease.
7. List the exercises in the rehabilitation of patients with respiratory disease.
8. Discuss on home mechanical ventilation.
9. Have the background knowledge and skills required for the rehabilitation of non – COPD lung disease and rehabilitation for the pediatric patient with pulmonary disease.
10. Have the background knowledge and skills required for physical medicine interventions and rehabilitation of the patient with neuromuscular weakness and surgical therapy for COPD patients.

Recommended books

- AACVPR Guidelines for Pulmonary Rehabilitation Programs. 5th edition
- Kaczmarek R, et al, eds. Egan's Fundamentals of Respiratory Care. 12th edition.
- John E. Hodgkin: Pulmonary Rehabilitation: Guidelines to Success. 4th edition.
- White, G. (2012). Basic Clinical Lab Competencies for Respiratory Care: An Integrated Approach 5th edition

SLEEP MEDICINE AND POLYSOMNOGRAPHY

Core: Course
Credit:04

Theory: 30 hours
Practical: 30 hours

Course Objectives

This course is taught in lecture/theory format and practical sessions. This is a comprehensive course which provides an overview of sleep medicine which includes the physiological basis of sleep, human circadian rhythm sleep disorders and its management. This course also focuses on the polysomnography and interventional strategies include PAP therapy and titration, surgical management etc. Practical sessions are incorporated to develop the skills to perform sleep study and therapeutic interventions.

Course Outline

Topic

1. **Introduction to Sleep Medicine and Polysomnography**
 - 1.1. The scope of modern sleep medicine
 - 1.2. The evolution of polysomnographic technology
2. **Physiology of Normal Sleep**
 - 2.1 Human Sleep- Neurophysiology, patterns and phenomenon
 - 2.1 Human Circadian Rhythm

Sleep stages and Changes to Sleep Architecture

Sleep and Aging

Effects of drugs on Sleep

Pregnancy and Sleep

3. **Sleep Disorders**
 - 3.1 Classification of Sleep Disorders
 - 3.2 Obstructive Sleep Apnea
 - 3.3 Sleep Related Breathing Disorders
 - 3.4 Hypersomnia of Central Origin
 - 3.5 Periodic Leg Movement Disorders
 - 3.6 Restless Legs Syndrome
 - 3.7 Narcolepsy
 - 3.8 Parasomnias
 - 3.9 Insomnia
 - 3.10 Circadian Rhythm Sleep Disorders
 - 3.11 Isolated Symptoms
 - 3.12 Other Sleep Disorders
4. **Systemic Sleep Disorders**
 - 4.1 Cardiopulmonary Disorders and Sleep
 - 4.2 Neurologic Disorders and Sleep
5. **Diagnostic Equipment**
 - 5.1 Basic Electronics
 - 5.2 Signal Pathways
 - 5.3 Monitoring Devices
 - 5.4 Differential Amplifier
 - 5.5 Digital Polysomnography
6. **Patient Connection Procedures**
 - 6.1 International 10-20 System
 - 6.2 Electrode Sites
 - 6.3 Electrode Application
 - 6.4 Impedance Checks
 - 6.5 Tricks and Tips
7. **Patient Preparation**
 - 7.1 Patient Interviewing
 - 7.2 Patient Assessment

8. **Overnight Sleep Study**

- 8.1 Order of Operations
- 8.2 Reviewing the Patient Chart
- 8.3 Preparing the Patient Tray
- 8.4 Preparing the Patient Room
- 8.5 Connecting the Diagnostic Equipment
- 8.6 Selecting a Montage
- 8.7 Amplifier Calibrations
- 8.8 Patient Questionnaires
- 8.9 Patient Education
- 8.10 Physiologic Calibrations
- 8.11 Technician Notes and Documentation
- 8.12 Ending the Study
- 8.13 Patient Discharge

9. **Performing a CPAP Titration**

- 9.1 Positive Airway Pressure Therapy- Parts and machine interface
- 9.2 Masks-Type and Fitting
- 9.3 CPAP and CPAP titrations
- 9.4 Bi-Level PAP and titration
- 9.5 Split-Night Polysomnography
- 9.6 Supplemental O2
- 9.7 Auto-titrating Devices for Positive Airway Pressure

10. **Interventions and Therapeutics**

- 10.1 MSLT - Multiple Sleep Latency Test
- 10.2 MWT - Maintenance of Wakefulness Test
- 10.3 REM Behavior Disorder Study
- 10.4 Nocturnal Seizure Study
- 10.5 Ambulatory Sleep Study/ Home Sleep Apnea Testing (HSAT)
- 10.6 Other Diagnostic Procedures

11. **Polysomnogram Channels**

- 11.1 EEG Channels
- 11.2 EOG Channels
- 11.3 EMG Channels
- 11.4 EKG Channels
- 11.5 Respiratory Channels
- 11.6 SpO₂
- 11.7 Body Position

12. **Scoring of Sleep and Events**

- 12.1 Apnea- Hypopnea Index
- 12.2 Sleep staging Rules
- 12.3 Arousal Rules
- 12.4 Cardiac Rules
- 12.5 Movement rules
- 12.6 Respiratory rules
- 12.7 Sleep Study Times, Formulas, and Calculations

13. **Pharmacology in Sleep Medicine**

- 13.1 Hypnotics
- 13.2 Stimulants
- 13.3 Sedatives
- 13.4 Antipsychotics and antidepressants
- 13.4 Effect of medication on MSLT and MWT

14. **Other Interventions and Therapeutics**

- 14.1 Dental Sleep Medicine
- 14.2 Surgical and Pharmacologic Treatment of Sleep Disorders
- 14.3 Sleep Hygiene
- 14.4 Patient and Family Education

Course Outcome:

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

- Understand the evolution and scope of sleep medicine
- Discuss the importance of sleep and its normal physiology
- Understand the different stages of sleep and its changes to sleep architecture
- Learn about various sleep disorders and management strategies
- Explain the indications of polysomnography and patient preparation
- Understand and learn the aspects of conducting sleep study, scoring and reporting.
- Discuss the diagnostic criteria and interventional practices for each sleep disorders.
- Understand the main electrodes and other biopotentials used in sleep studies
- Understand the role of pharmacology in sleep medicine

Recommended books

- William H. Spriggs - Essentials of Polysomnography: A Training Guide and Reference for Sleep Technicians- 2nd Edition
- Lee-Chiong Teofilo, Cynthia Mattice, Rita Brooks - Fundamentals of Sleep Technology, 3rd Edition
- Kryger, Roth and Dement- Principles and practice of sleep medicine -5th edition
- Sudhansu Chokroverty - Sleep Disorders Medicine: Basic Science, Technical Considerations and Clinical Aspects-4th Edition
- The AASM manual for scoring of sleep and associated events rules,
- Terminology & Technical Specifications – version 2.4

CLINICAL TRAINING - IV

Total : 330 hours

Core: course
Credit:04

Course Objectives: This course will provide a practical and demonstrative approach about modalities of pulmonary rehabilitation, home mechanical ventilation, non-invasive ventilation.

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

- Practical demonstration for the topics learnt during theory classes

SERIAL NO.	TOPICS
1.	Practicum on Neonatal and Paediatric Resuscitation
2.	Practicum and clinical case presentation on therapeutic approaches in treatment for neonatal and pediatric disorders
3.	Practicum and demonstration about Unconventional modes of Ventilation, including HFOV
4.	Practicum and demonstration about pulmonary rehabilitation devices and modalities
5.	Practicum and demonstration about disease specific management in neonates and pediatrics
6.	Performs 6-minute timed distance walk test, completes the Calculations for the exercise prescription, and documents correctly.
7.	Instructs patient and family in the home exercise program (HEP) and has them keep an exercise log
8.	Select appropriate device for Home care
9.	Practicum and demonstration about sleep study and CPAP titration.

CLINICAL INTERNSHIP (1 Year)

Description:

- Students must complete one-year compulsory clinical internship in various hospitals and patient care settings, associated to Yenepoya University during which the students get to master 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 internship 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 theatres and rehabilitation Centre.

Eligibility:

- Candidate who has successfully completed his/her theory and practical courses and exams of the first three years of Respiratory Therapy Degree program.

Duration:

- One year

Acknowledgement:

The Curriculum Development Committee of Indian Association of Respiratory Care (IARC)