

**BACHELOR OF VOCATION
CRITICAL CARE MANAGEMENT (CCM)
COURSE STRUCTURE AND SYLLABUS: W.E. F 2020-21 Admitted batch
III year –V Semester**

Course No.	Course Name	Mid semester	Semester final	Total marks	Teaching Hours/ Week	Credits
1	Chemistry Paper-1 (Theory)	25	75	100	4	4
2	Chemistry Paper-1 lab (Practical)	0	50	50	2	1
3	Chemistry Paper-2 (Theory)	25	75	100	4	4
4	Chemistry Paper-2 lab (Practical)	0	50	50	2	1
5	Maintenance of ICU Equipment & Troubleshooting	25	75	100	4	4
6	Practical: Maintenance of ICU Equipment & Troubleshooting	0	50	50	2	1
7	ICU Therapy-1	25	75	100	4	4
8	Practical: ICU Therapy-1	0	50	50	2	1
9	ICU Therapy -2	25	75	100	4	4
10	Practical: ICU Therapy -2	0	50	50	2	1
11	Admin, Medico Legal and Interventional Procedures	0	50	50	2	2
12	OJT	0	50	50	2	1
	TOTAL			850	34	28

*** As per CBCS-2021 syllabus

1. Program Aim, objectives

After the Completion of this program student shall acquire the:

- Ability to ensure that medical equipment is well maintained and safely functional.
- Follow safety codes and standards, troubleshoot faulty devices and achieve appropriate skills for employment.
- Ability to Operate equipment in ICU & Emergency wards

2. Learning outcomes of Subject (in consonance with the Bloom's Taxonomy):

The Learning Outcomes of the program could be in consonance with the various equipment's in ICU, which includes –

1. Remember (Lower Order)
 2. Understand (Lower Order)
 3. Apply (Lower Order)
 4. Analyze (Higher Order)
 5. Evaluate & Problem Solving (Higher Order)
 6. Create new Technologies (Higher Order)
- **Critical Thinking:** Able to understand and utilize the principles of scientific enquiry, think analytically, clearly and evaluate critically while solving problems and making decisions during various emergencies situations and machinery problems.
 - **Effective Communication:** Able to formally communicate Scientific ideas and practical diagnosis of various emergency cases to others using both oral and written communication skills.
 - **Social Interaction:** Able to develop individual behaviour and influence society and social structure.
 - **Effective Citizenship:** Able to work with a sense of responsibility towards social awareness and follow the ethical standards in the society.
 - **Ethics:** Ability to demonstrate and discuss ethical conduct in scientific activities.
 - **Self-directed and life-long learning:** Able to recognize the need of life-long learning and engage in research and self-education.

3. GENERAL CURRICULAR ACTIVITIES

Lecturer-based:

1. **Class-room activities:** Organization of Group discussions, question-answer sessions, scientific observations, use of audio-visual aids, guidance program, examination and evaluation work (scheduled and surprise tests), quizzes, preparation of question banks, student study material, material for PG entrance examinations etc.
2. **Library activities:** Reading books and magazines taking notes from prescribed and reference books and preparation of notes on lessons as per the syllabus; Reading journals and periodicals pertaining to different subjects of study; Making files of news-paper cuttings etc.
3. **Lab activities:** Organization of practical's, maintenance of lab attendance registers/log registers, maintenance of glassware and chemicals
4. **Activities in the Seminars, workshops and conferences:** Organization of at least one seminar/workshop/conference per academic year either on academic/research aspects and inculcate research spirit among students
5. **Research activities:** Student study projects (General / RBPT model), Minor or Major research projects, Research guidance to research scholars, Publication of research articles/papers (at least one in 2 years) in UGC-recognized journals, Registration in Vidwan /Orcid /Scopus/Web of Science
6. **Smart Classroom Activities:** Organization of Departmental WhatsApp groups, Ed Modo groups/Google Class Rooms/Adobe Spark groups for quick delivery of the subject; Preparation of Moocs content & presentation tube lessons by trained lecturers; Using smart/digital/e- class rooms (mandatory) wherever present; Utilization of YouTube videos (subject to copy rights) etc.

4. STUDENT-BASED:

- 1) **Class-room activities:** Power point presentations, Seminars, assignments
- 2) **Library activities:** Visit to library during library hour and preparation of notes
- 3) **Lab activities:** Maintenance of observation note book and record, keeping lab clean and tidy
- 4) **Activities in the Seminars, workshops and conferences:**
Participation/presentation in seminar/workshop/conference
 1. Recommended Skill enhancement courses: (Titles of the courses given below and details of the syllabus for 4 credits (i.e., 2 units for theory and Lab/Practical) for 5 hrs class-cum-lab work
 2. Recommended Co-curricular activities:(Co-curricular Activities should not promote copying from text book or from others' work and shall encourage self/independent and group learning)

The co-curricular activities are aimed at strengthening the theoretical knowledge with an activity related to the content taught in the class room. The aesthetic development, character building, spiritual growth, physical growth, moral values and creativity of the student.

The different types of co-curricular activities relevant to MEDICAL domain are listed below:

A. Academic -based

- Preparation of Charts/Clay or Thermocol Models
- Debates, Essay Writing Competitions
- Group Discussions
- Departmental magazine
- Formation of Book clubs
- Viva-Voce

B. Lab/Research –based

- Digital dissections
- Field Visit/Visiting hospitals and primary health centers and submission of report
- Training at research centers (Hospitals, Diagnostic centers)
- Exposure to scientific instruments and hands-on experience

C. Value -based

Organization of first-aid camp, swachha Bharath, cleanliness week, girl-child importance, Nutrition and health awareness etc.

World Cancer Day (February 4 th)	World tobacco day (May 31 st)
National Science Day (Feb 28 th)	World polio day (October 24 th)
National doctors day(march 30 th)	World health day(April 7 th)
World heart day(29 th September)	World kidney day(2 nd Thursday in march)
World diabetes day(14 th November)	World liver day(19 th April)

D. General

- Collection of news reports and maintaining a record of paper-cuttings relating to topics covered in syllabus
- Group Discussions on:
- Watching TV discussions and preparing summary points recording personal observations etc., under guidance from the Lecturers
- Any similar activities with imaginative thinking.

5. Recommended Continuous Assessment methods:

75 Marks semester End Examinations and 25 Marks CIA

Required instruments/software/ computers for the course
 (Lab/Practical course- wise required i.e., for a batch of 15 students)

S. No.	Lab/Practical Name	Names of Instruments/Software/ computers required with specifications	Brand Name	Required Qty.
1.	MAINTENANCE OF ICU EQUIPMENT TROUBLESHOOTING	Monitors	GE	1
		ECG machine		
2.	ICU THERAPY -1	ventilator	GE	1
3.	ICU THERAPY -2	ABG machine	GE	1
		Defibrillator	GE	1
		Infusion pumps	PHILIPS	1
		Syringe pumps	PHILIPS	1

Details of course-wise Syllabus

B VOC CCM	CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 4
PAPER-3 VOCATION COMPONENT	MAINTENANCE OF ICU EQUIPMENT AND TROUBLESHOOTING	Hrs/Wk: 4

Aim and objectives of Course: Maintenance of ICU Equipment and Troubleshooting

At the end of this year, student should be able to:

1. To Troubleshooting of basic clinical equipment.
2. To handle the equipment in OT
3. **Detailed Syllabus: (Five units with each unit having 12 hours of class work)**

Unit I Troubleshooting fundamentals

Fundamental troubleshooting procedures, Causes of equipment failure, Troubleshooting process & fault finding aids, Techniques involved Grounding systems in electronic equipment, Temperature Sensitive Intermittent problems, Correction action. Mechanical Ventilators Non-invasive ventilators, Pumps: Infusion, syringe, Monitors: Stand-alone & multi-parameter, Cardiac Output monitors, ECG machine, ABG machine, Defibrillator, Ultrasound machine, Bronchoscope

Unit II Preventive Maintenance

Equipment maintenance – schedule and corrective maintenance, Levels of maintenance, Knowledge of codes and standards, Code of conduct and documentation policy, Inventory management, Train and educate hospital staff.

Unit III Troubleshooting procedures

Equipment – Operating & service manuals, Log book entry and fault analysis, Manuals in fluent language, Consumables and spares supply, Inspection and testing, reduce repetition of errors.

Unit IV Troubleshooting of basic clinical equipment

Troubleshooting of Stethoscope, sphygmomanometer, nebulizer, Centrifuge, Microscope, Blood collection monitor

Unit V Troubleshooting of OT equipment

Troubleshooting of Suction apparatus, Pulse Oximeter, Drug delivery device, Patient warmer, OT table & light.

Reference:

1. Ministry of Health and Family Welfare, New Delhi (2010), “Medical Equipment
2. Maintenance Manual” – A first line maintenance guide for end users

4. Details of Lab/Practical/Experiments/Tutorials syllabus:

PRACTICALS

1. Blood collection monitor.
2. ECG machine.
3. ABG machine.

5. MODEL QUESTION PAPER

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 4
PAPER-3 VOCATION COMPONENT	Maintenance of ICU Equipment & Troubleshooting	Hrs/Wk: 4

I. Answer any Five of the following questions

5x5=25M

1. Explain Blood collection monitor.
2. Explain Troubleshooting of Stethoscope and Centrifuge.
3. Explain Inspection and testing.
4. Explain Knowledge of codes and standards.
5. Explain Code of conduct and documentation policy.
6. Explain Causes of equipment Failure.
7. Explain Troubleshooting of Suction apparatus?
8. Explain Inventory management.

II. Answer the following questions

5X10=50M

9. a. Explain in detail about Mechanical Ventilators, Non-invasive ventilators.
(Or)
b. Explain about Temperature Sensitive Intermittent problems.
10. a. Explain Cardiac Output monitors, ECG machine.
(Or)
b. Explain Grounding systems in electronic equipment.
11. a. Explain Troubleshooting of Patient warmer, OT table.
(Or)
b. Explain Ultrasound machine, Bronchoscope.
12. a. Explain Consumables and spares supply?
(Or)
b. Explain Troubleshooting of Pulse Oximeter, Drug delivery device.
13. a. Explain ABG machine, Defibrillator.
(Or)
b. Explain Troubleshooting of sphygmomanometer, nebulizer.

6. LAB MODEL QUESTION PAPER

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 1
PAPER-3 VOCATION COMPONENT	Maintenance of ICU Equipment & Troubleshooting	Hrs/Wk: 2

1. Sphygmomanometer, nebulizer.
2. Code of conduct and documentation policy.
3. Inventory management.
4. Mechanical Ventilators Non-invasive ventilators.

Allotment of marks to be followed for evaluation of the practical

1. Record	10Marks
2. Day to day activity	20Marks
3. Procedure/Observation	10 Marks
4. Viva	10Marks
TOTAL	50 Marks

Details of course-wise Syllabus

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 4
PAPER-4 VOCATION COMPONENT	ICU THERAPY -1	Hrs/Wk: 4

1. Aim and objectives of Course:

1. To safe handle the equipment in OT
2. Describes working of ventillators
3. To safe handle the equipment in ICU
4. Maintaining the equipment in ICU and handling the controls.

2. Detailed Syllabus: (Five units with each unit having 12 hours of class work)

Unit-1:

Mechanical ventilation/ventilator dependence/difficult weaning
Basic Concepts, Mechanics of ventilation, Mechanics of exhalation, Work of breathing, Distribution of ventilation, Efficiency and effectiveness of ventilation, Indications, Mechanical Ventilators, How ventilators work, Operator interface, Types of ventilators

Unit-2:

Modes of Mechanical Ventilation, Basic and newer modes, Ventilator initiation, Initial ventilator settings, Adjusting ventilator settings, Oxygenation, Ventilation, Timing – Inspiratory of gas / Expiratory, inspiratory hold, Flow, Tidal volume, Pressure- Peak /Plateau, PEEP, POP – OFF, Pressure support, Proximal airway (VS) distal, FiO₂

Unit 3:

Humidification, Humidifier type, Advantages & amp; disadvantages Non-Invasive Ventilation, Types of NIV (CPAP, BIPAP), Goals & indications of NIV, Patient selection and exclusion criteria for NIV, Equipment used in the application of NIV, Instituting and managing NIV, Complications of NIV, Time &; cost associated with NIV Trouble shooting and alarms

Unit-4:

Weaning and Extubation , Weaning, Definitions ,Reasons for ventilator dependence, Patient evaluation, Preparing the patient, Methods, Newer techniques for facilitating ventilator discontinuance, selecting an approach, Monitoring the patient during weaning, Chronically ventilator dependent patients &; difficulty in weaning, Terminal weaning, Extubation, Indications, Procedure, Post extubation care

Unit 5:

Nebulization and MDI, Inhaled drug Therapy, Nebulization ,Different Types Advantages &; disadvantages, MDI with spacer, Characteristics of therapeutic aerosols, Hazards of aerosols therapy, Aerosol drug delivery system, Assessment based bronchodilator therapy protocols Special considerations, Controlling environmental and contamination suctioning and chest physiotherapy, Incentive Spirometry, Inspiratory resistance exercises, Care of Patient on Ventilator, Ensuring proper placement Cuffpressure,

Tracheo bronchial hygiene & suctioning, Humidification, chest physiotherapy, Ventilator settings, Monitoring ventilatory parameters, Care of the chest tube, Drainage systems of pleural fluid.

3. Details of Lab/Practical/Experiments/Tutorials syllabus:

1. Drainage systems of pleural fluid
2. Inspiratory resistance exercises.
3. MDI with spacer
4. Indications of NIV
5. Terminal weaning

4. MODEL QUESTIONPAPER

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 4
PAPER-4 VOCATION COMPONENT	ICU THERAPY-1	Hrs/Wk: 4

I. Answer any Five of the following questions

5x5=25M

1. Explain Efficiency and effectiveness of ventilation.
2. Explain Care of Patient on Ventilator.
3. Explain of Characteristics of therapeutic aerosols.
4. Explain POP – OFF, Pressure support.
5. Explain Chest physiotherapy.
6. Explain Efficiency and effectiveness of ventilation.
7. Explain Inhaled drug Therapy.
8. Explain Care of the chest tube.

II. Answer The following questions

5X10=50M

9. a. Explain Pressure support, proximal airway distal.
(Or)
b. Explain Tidal volume, Pressure- Peak.
10. a. Explain types of ventilators.
(Or)
b. Explain Oxygenation and Ventilation.
11. a. Explain types of NIV, CPAP and BIPAP.
(Or)
b. Explain Equipment used in the application of NIV.
12. a. Explain Modes of Mechanical Ventilation.
Or
b. Explain PEEP.
13. a. Explain FiO₂ .
Or
b. Explain Ventilator setting?

5. PRACTICAL MODEL QUESTIONPAPER

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 1
PAPER-4 VOCATION COMPONENT	ICU THERAPY 1	Hrs/Wk: 2

1. Care of Patient on Ventilator
2. Adjusting ventilator settings
3. Weaning and Extubation
4. NIV

Allotment of marks to be followed for evaluation of the practical

1. Record-----	10Marks
2. Day to day activity----	20Marks
3. Procedure/Observation	10 Marks
4. Viva-----	10Marks
TOTAL	50 Marks

Details of course-wise Syllabus

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 4
PAPER-5 VOCATION COMPONENT	ICU THERAPY -2	Hrs/Wk: 4

1. Aim and objectives of Course: ICU THERAPY -2

1. To safe handle the equipment in OT
2. Describes working of ventillators
3. To safe handle the equipment in ICU
4. Maintaining the equipment in ICU and handling the controls.

2. Detailed Syllabus: (Five units with each unit having 12 hours of classwork)

Patient preparation, Imaging techniques and protocols for various parts of body

Unit 1

Extubation failure, Airway Assistance, Tracheal intubation (oral, nasal,Cricothyrotomy, Open/percutaneous tracheostomy ,Fiberoptic bronchoscopy, FOB Intubation,Therapeutic BAL,Decanulation of tracheostomy

Unit-2:

Cardiovascular system, Fluid resuscitation and inotropes,Basic of IABP /ECMO, Pericardiocentesis, Life support,Basic life support,AED, Mask ventilation, Chest compression, Advanced cardiac life support ,Drugs, defibrillation

Unit 3:

Trauma life support

A –Airway and cervical spine stabilization

B – Breathing

C –Circulation and hemorrhage control

D –Disability

E –Exposure

Unit-4:

Manual in line stabilizationBasic care of surgical wounds and fractures, Burns Assessment ,History and physical assessment, Assessment of burns and fluid and electrolyte loss, Etiology classification, Pathophysiology, clinical manifestations, Diagnosis, treatment modalities, Renal /Abdomen

Unit-5:

Basics of Renal Replacement Therapy, modes of dialysis, Intra-abdominal pressure, abdominal compartment syndrome, Central Nervous system, Care of Unconscious Patient, Comfort,Skin integrity assessment and care,Physiotherapy – chest &limbs,Nutritional needs & supply, Pain Control, Care of epidural, Patient control led analgesia, Infection Control,Hand hygiene,Universal precautions

3. Details of Lab/Practical/Experiments/Tutorials syllabus:

- Clinical rotations in selected Medical and Surgical areas
- Patient assignments for patient centered comprehensive care
- Case presentations,
- Drug study discussion

4. MODEL QUESTIONPAPER

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 4
PAPER-5 VOCATION COMPONENT	ICU THERAPY -2	Hrs/Wk: 4

I. Answer any Five of the following questions

5x5=25M

1. Explain about Breathing.
2. Explain about Decanulation of tracheostomy.
3. Explain the Burns Assessment.
4. .Explain the care of surgical wounds and fractures.
5. Explain chest Physiotherapy.
6. Explain Hand hygiene.
7. Explain Fluid resuscitation and inotropes.
8. Explain Renal Replacement Therapy.

II. Answer The following questions

5X10=50M

9. a. Explain Abdominal compartment syndrome.
(Or)
b. Explain Airway and cervical spine stabilization.
10. a. Explain Assessment of burns and fluid and electrolyte loss.
(Or)
b. Explain –Disability.
11. a. Explain Advanced cardiac life support.
(Or)
b. Explain Basic life support.
12. a. Explain AED, Mask ventilation, Chest compression.
(Or)
b. Explain Care of Unconscious Patient.
13. a. Explain Circulation and hemorrhage control.
Or
b. Explain defibrillation.

5. LAB MODEL QUESTION PAPER

B VOC CCM	CCM CRITICAL MANAGEMENT CARE (Semester: V)	Credits: 1
PAPER-5 VOCATION COMPONENT	ICU THERAPY -2	Hrs/Wk: 2

1. Breathing
2. Renal Replacement Therapy
3. Abdominal compartment syndrome

Allotment of marks to be followed for evaluation of the practical

1. Record-----	10Marks
2. Day to day activity---	20Marks
3. Procedure/Observation	10 Marks
4. Viva-----	10Marks
TOTAL	50Marks

Details of course-wise Syllabus

B VOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Credits: 2
PAPER-6 VOCATION COMPONENT	Admin, Medico Legal and Interventional Procedures	Hrs/Wk: 2

1. Aim and objectives of Course: Admin, Medico Legal and Interventional Procedures

1. To safe handle the equipment in OT
2. Describes working of ventilators
3. To safe handle the equipment in ICU
4. Maintaining the equipment in ICU and handling the controls.

2. Detailed Syllabus: (Three units with each unit having 12 hours of class work)

Unit-1

Principals of Management: Introduction to management, Strategic Management, Foundations of Planning, Planning Tools and Techniques, Decision Making, conflict and stress management, Managing Change and Innovation, Understanding Groups and Teams, Leadership, Time Management, Cost and efficiency.

Unit-2

Medical law: Medical ethics; Definition, Goal, Scope; Introduction to Code of conduct; Basic principles of medical ethics – Confidentiality; Malpractice and negligence; Autonomy and informed consent

Unit-3:

Medical ethics: Right of patients; Care of the terminally ill-Euthanasia ;Organ transplantation; Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records – other various aspects; Professional Indemnity insurance policy; Development of standardized protocol to avoid near miss or sentinel events; Obtaining an informed consent.

Unit-4

Quality and patient safety: Quality assurance; Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Quality Improvement Tools, Introduction to NABH guidelines; AERB specifications, radiation safety (lead glass equivalence, lead lined doors), room size, type approval, registrations & licenses, selection of exposure parameter for various protocols, diagnostic reference levels.

Unit-5

Basics of emergency care and life support skills: Basic life support (BLS), sudden Cardiac Arrest (SCA), cardiopulmonary resuscitation (CPR), Automated External Defibrillator (AED).

3. MODEL QUESTION PAPER

BVOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Max. Marks: 50
PAPER- 6	Admin, Medico Legal and Interventional Procedures	2Hrs

I. Answer any Four of the following questions

4x5=20M

1. Explain Quality Improvement Tools.
2. Explain basic principles of medical ethics.
3. Explain about Decision Making.
4. Explain the informed consent.
5. Explain CPR.
6. Explain AERB specifications.
7. Explain NABH guidelines.

Answer the following questions

3X10=30M

- 8 a. Explain Quality Improvement Approaches,
(Or)
b. Explain AED?
9. a. Explain patient safety.
Or
b. Write in detail about SCA.
10. a. Explain Principals of Management?
Or
b. Write about BLS.

BVOC CCM	CCM CRITICAL CARE MANAGEMENT (Semester: V)	Max. Marks: 50
PAPER- 6	OJT :Admin, Medico Legal and Interventional Procedures	3 Hrs

Allotment of marks to be followed for evaluation of OJT

1. Preparation of Project Report	10Marks
2. Presentation of Report-----	10Marks
3. Internship/Day today activity	20 Marks
4. Viva-voce-----	10Marks
TOTAL	50 Marks

LIST OF PAPER SETTERS FOR VOCATIONAL COURSES

CRITICAL CARE MANAGEMENT (CCM)

S. No.	Name of the Examiner	College	Experience
1	Dr. K. Sambasiva Rao	Rangaraya medical college, Kakinada	10 yrs
2	Dr. B. Anu Radha	Rangaraya medical college, Kakinada	20 yrs
3	Dr. B. Sowbhagya Lakshmi	Rangaraya medical college, Kakinada	20yrs
4	Dr. M. Santhi Sree	Rangaraya medical college, Kakinada	8 yrs
5	Dr. K. Vindhya	Rangaraya medical college, Kakinada	9 yrs
6	Ms.G.Mohini Latha	PVR TRUST college, Kakinada	1 yrs