

Courses specification 1st year 2nd semester

Course Specification

| 1. Course Identification and General Information: | | | | | | |
|--|--|-----------------------------|---------|----|-----|-------|
| 1 | Course Title: | Medical Technology | | | | |
| 2 | Course Code & Number: | MCCN01 | | | | |
| 3 | Credit hours: 3 | C.H | | | | TOTAL |
| | | Th. | Seminar | Pr | Tr. | |
| | | 2 | - | 1 | | 3 |
| 4 | Study level/ semester at which this course is offered: | First year/ Second semester | | | | |
| 5 | Pre –requisite: | - | | | | |
| 6 | Co –requisite : | - | | | | |
| 7 | Program (s) in which the course is offered: | Critical care nursing | | | | |
| 8 | Language of teaching the course: | English | | | | |
| 9 | Location of teaching the course: | Faculty of Nursing | | | | |
| 10 | Prepared By: | Prof. | | | | |
| 11 | Date of Approval | 2022 | | | | |

2. Course Description:

The course focuses on understanding and management of Arterial Lines; Central venous Lines; Pulmonary Artery Catheters, Pulse Oximetry SpO₂; Capnography - EtCO₂, intercostal catheters & Underwater Sealed Drainage. Defibrillation: Manual External & Automated external defibrillation (AED), cardiac monitors, ventilators (SIMV, CMV, weaning from ventilator), continuous positive airway pressure (CPAP), bi-level positive airway pressure (BiPAP), infusion pumps, syringe pumps, , intra-aortic balloon therapy, heart lung machine, heart mate, pulse contour cardiac output (PICCO), active humidifiers, Baer Hugger & blood warmer, cell saver-autologous blood recovery system, Intracranial pressure monitoring, pacemakers and ICD, prisma dialysis machine , extracorporeal membrane oxygenation (ECMO) and plasmapheresis.

III. Intended learning outcomes of the course (ILCOs) and their alignment to Program Intended learning outcomes (PILOs)

| ILCOs | PILOs |
|---|--------------|
| 1. Understanding and management of Arterial and Central Lines, Pulse Oximetry SpO ₂ and Capnography | A1 |
| 2. Understanding and management of Infusion, Underwater Sealed Drainage and Hemodynamic monitoring Defibrillation, Baer Hugger & amp, Intracranial pressure monitoring | A1 |
| 3. Interpretation and management of Basics of ECG | B2 |
| 4. Explain when mechanical ventilation is needed and how the ventilator modes and settings are determined. | A4 |
| 5. Recognize components and normal values of the conduction system and the related PQRST of the ECG tracing and hemodynamic monitoring. | B1 |
| 6. Differentiate normal and abnormal values for ABG analysis; respiratory acidosis, respiratory alkalosis, metabolic acidosis and metabolic alkalosis | B4 |
| 7. Apply leads for cardiac monitoring, interpret and monitor cardiac rhythms | C2 |
| 8. Monitor hemodynamic status, and recognize signs and symptoms of hemodynamic instability | C2 |
| 9. Manage patients requiring 12-lead ECG, arterial catheter, cardiac catheterization, cardioversion, central venous pressure monitoring, defibrillation and invasive hemodynamic monitoring. | C4 |
| 10. Apply pulmonary therapeutic interventions related to mechanical ventilation such as airway clearance, intubation, weaning, extubation, respiratory monitoring devices, therapeutic gases, thoracentesis and tracheostomy with mechanical ventilation. | C2 |

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

| Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
|---|----------------------------|--|
| a1. Understanding and management of Arterial and Central Lines, Pulse Oximetry SpO ₂ and Capnography | Lecture Discussion | Essay type Short answer Objective type |
| a2. Understanding and management of Infusion, Underwater Sealed Drainage and Hemodynamic monitoring Defibrillation, Baer Hugger & amp, Intracranial pressure monitoring | Lecture Discussion | Essay type Short answer Objective type |

| | | |
|--|-------------------------------------|--|
| a3. Explain when mechanical ventilation is needed and how the ventilator modes and settings are determined. | Lecture Discussion | Essay type Short answer Objective type |
| (B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies: | | |
| Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| b1. Interpretation and management of Basics of ECG | Lecture Discussion Demonstration | Short answer Objective type |
| b2. Recognize components and normal values of the conduction system and the related PQRST of the ECG tracing and hemodynamic monitoring. | Lecture Discussion Demonstration | Short answer Objective type |
| b3. Differentiate normal and abnormal values for ABG analysis; respiratory acidosis, respiratory alkalosis, metabolic acidosis and metabolic alkalosis | Lecture Discussion Demonstration | Short answer Objective type |

| | | |
|---|-------------------------------------|--------------------------------|
| (C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies: | | |
| Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| c1. Apply leads for cardiac monitoring, interpret and monitor cardiac rhythms | Lecture Discussion Demonstration | Short answer Objective type |
| c2. Monitor hemodynamic status, and recognize signs and symptoms of hemodynamic instability | Lecture Discussion Demonstration | Short answer Objective type |
| c3. Manage patients requiring 12-lead ECG, arterial catheter, cardiac catheterization, cardioversion, central venous pressure monitoring, defibrillation and invasive hemodynamic monitoring. | Lecture Discussion Demonstration | Short answer Objective type |
| c4. Apply pulmonary therapeutic interventions related to mechanical | Lecture Discussion Demonstration | Short answer Objective type |

| | | |
|---|--|--|
| ventilation such as airway clearance, intubation, weaning, extubation, respiratory monitoring devices, therapeutic gases, thoracentesis and tracheostomy with mechanical ventilation. | | |
|---|--|--|

(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:

| Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
|-----------------------------------|---------------------|-----------------------|
| Not applicable | - | - |

3. Course Content:

A – Theoretical Aspect:

| Order | Units/Topics List | Sub Topics List | No. of Weeks | Contact hours | Learning Outcomes |
|-------|---------------------------------|---|--------------|---------------|-------------------|
| 1 | Arterial and Central Lines | <ul style="list-style-type: none"> • Arterial Lines • Central venous Lines • Pulmonary Artery Catheters | 1 | 2 | a1,a4,b2 |
| 2 | Pulse Oximetry SpO2 Capnography | <ul style="list-style-type: none"> • Pulse Oximetry SpO2 • Capnography: EtCO2, intercostal catheters & | 1 | 2 | a1,a4,b2 |
| 3 | Infusion | <ul style="list-style-type: none"> • Infusion pumps • syringe pumps • intra-aortic balloon therapy • heart lung machine, heart mate • pulse contour cardiac output (PICCO) • active humidifiers | 2 | 4 | a1,a4,b2 |
| 4 | Underwater Sealed Drainage. | <ul style="list-style-type: none"> • Underwater Sealed Drainage. | 1 | 2 | a1,a4,b2 |
| 5 | Hemodynamic monitoring | <ul style="list-style-type: none"> • Components, normal values, how values are obtained or calculated | 2 | 4 | a1,a4,b2 |

| | | | | | |
|---|----------------------|--|---|---|----------|
| | | <ul style="list-style-type: none"> • care of the patient with hemodynamic monitoring • Interpreting hemodynamic values | | | |
| 6 | Midterm exam | | 1 | 2 | a1,a4,b2 |
| 7 | Cardiac Dysrhythmias | <ul style="list-style-type: none"> • Review of Conduction System • Basics of ECG Interpretation • Dysrhythmia: • The Sinus Rhythms(Normal Sinus Rhythm, Sinus Tachycardia, and Sinus Bradycardia and Sinus Arrhythmia), The Atrial Rhythms (Wandering Pacemaker, Atrial Tachycardia, Atrial Fibrillation and Atrial Flutter), The Junctional Rhythms (Junctional Escape Rhythm, Accelerated Junctional Rhythm and Junctional Tachycardia), The Heart Blocks (First Degree, Second Degree Type I and II and Third Degree Heart Block), The Ventricular Rhythms(Ventricular Tachycardia, Ventricular Fibrillation and Idioventricular Rhythm). | 3 | 6 | a1,a4,b2 |
| 8 | Defibrillation | <ul style="list-style-type: none"> • Defibrillation: Manual • External & • Automated external defibrillation (AED) • Cardiac monitors | 1 | 2 | a1,a4,b2 |

| | | | | | |
|--|----------------------------------|--|-----------|-----------|----------|
| 9 | Baer Hugger & amp | <ul style="list-style-type: none"> • Baer Hugger & amp; blood warmer • cell saver-autologous blood recovery system | 1 | 2 | a1,a4,b2 |
| 10 | Intracranial pressure monitoring | <ul style="list-style-type: none"> • Intracranial pressure monitoring • prisma dialysis machine • extracorporeal membrane oxygenation (ECMO) and plasmapheresis. | 1 | 2 | a1,a4,b2 |
| 11 | Mechanical Ventilation | <ul style="list-style-type: none"> • Principles of mechanical ventilation • Ventilator modes and settings • Ventilator changes effect on blood gases/ Weaning • Complications of ventilator • ABG analysis: <ul style="list-style-type: none"> ○ Oxygenation, devices ○ Review ABGs ○ Failure, exacerbations • ARDS, arrest • SIMV, CMV, weaning from ventilator • Continuous positive airway pressure (CPAP) • Bi-level positive airway pressure (BiPAP) | 2 | 4 | a1,a4,b2 |
| 12 | Final exam | | 1 | 2 | a1,a4,b2 |
| Number of Weeks /and Units Per Semester | | | 16 | 32 | |

| B - Clinical Aspect: | | | | |
|-----------------------------|--|------------------------|----------------------|--------------------------|
| Order | Tasks/ Experiments | Number of Weeks | Contact hours | Learning Outcomes |
| 1 | <ul style="list-style-type: none"> • Arterial Lines • Central venous Lines • Pulmonary Artery Catheters | 1-2 | 6 | c2 |
| 2 | <ul style="list-style-type: none"> • Pulse Oximetry SpO2 • Capnography: EtCO2, intercostal catheters & | 3-4 | 6 | c2 |
| 3 | <ul style="list-style-type: none"> • Infusion | 5 | 3 | c2 |
| 4 | <ul style="list-style-type: none"> • Underwater Sealed Drainage. | 6 | 3 | c2 |
| 5 | Hemodynamic monitoring: <ul style="list-style-type: none"> • Monitor hemodynamic status • Interpreting hemodynamic • Nursing care of the patient | 7-8 | 6 | c2 |
| 6 | Dysrhythmias: Apply leads for cardiac monitoring, interpret and monitor cardiac rhythms Manage patients requiring: <ul style="list-style-type: none"> • 12-lead ECG • arterial catheter • cardiac catheterization • cardioversion • central venous pressure monitoring • Defibrillation and invasive hemodynamic monitoring. | 9-11 | 12 | c4 |
| 7 | Defibrillation | 12 | 3 | c2 |
| 8 | Baer Hugger & amp | 13 | | c2 |
| 9 | Intracranial pressure monitoring | 14 | | c2 |
| 10 | Mechanical ventilation: Apply pulmonary therapeutic interventions related to mechanical ventilation such as: <ul style="list-style-type: none"> • airway clearance • intubation • weaning • Extubation | 15-16 | 6 | c2 |

| | | | | |
|--|--|-----------|-----------|----------|
| | <ul style="list-style-type: none"> • respiratory monitoring devices • therapeutic gases • thoracentesis • tracheostomy | | | |
| 11 | Final clinical exam | 17 | 3 | c2,c4.c5 |
| Number of Weeks /and Units Per Semester | | 17 | 51 | - |

I. Teaching strategies of the course:

1. Lecture Discussion
2. Presentation
3. Role playing
4. Case study reviews
5. Assignments
6. Activities

4. Teaching strategies of the course:

1. Lecture - Discussion
2. Demonstration

5. Assignments:

| No | Assignments | Aligned CILOs(symbols) | Week Due | Mark |
|----|-----------------|------------------------|----------|------|
| 1 | Write about EEG | a1,a4,b2 | 5-10 | 10 |

6. Schedule of Assessment Tasks for Students During the Semester

| No. | Assessment Method | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
|----------------------------|--------------------|---|------------|--------------------------------|----------------------------------|
| 1 | Student assignment | 5th - 12th week | 10 | 10 % | a1,a4,b2 |
| 2 | Presentation | 4 st - 14 th week | 20 | 20 % | a1,a4,b2 |
| 3 | Mid-term exam | 7th or 8th week | 20 | 20% | a1,a4,b2 |
| 4 | Final exam | 16th-17th week | 50 | 50 % | a1,a4,b2 |
| Total Theory Weight | | | 100 | 100% | |

| Clinical part | | | | | |
|-------------------------------|--------------------------|---|------------|--------------------------------|----------------------------------|
| Assessment | Type of Assessment Tasks | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
| 1 | Attendance and Attitude | 14 th week | 10 | 10% | a5,c2,c3,c4,c5 |
| 2 | Semester work | 1 st -14 th week | 50 | 10% | a5,c2,c3,c4,c5 |
| 3 | Final exam (theory/oral) | 15 th week | 15 | 50% | a5,c2,c3,c4,c5 |
| 4 | Final exam (practical) | 16 th -17 th week | 25 | 30% | a5,c2,c3,c4,c5 |
| Total Practical Weight | | | 100 | 100% | |

| 7. Learning Resources: | |
|---|---|
| 1- Required Textbook(s) | |
| | 1. Joseph M.C., Vetta R.W. , Taylor R.K. Critical care Medicine . 2 nd .2011 |
| 2- Essential References. | |
| | 1. Shoemaker .woliam C. et al Text book of critical care. W B Saunders Company Philadelphia 2007. |
| 3- Electronic Materials and Web Sites etc. | |
| | http://www.google.com |

| 7. Course Policies: | |
|---------------------|---|
| 1. | Class Attendance: At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam |
| 2. | Tardy: any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent. |
| 3. | Exam Attendance/Punctuality: Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent. |
| 4. | Assignments & Projects: Assignments and projects will be assessed individually unless the teacher request for group work |
| 5. | Cheating: Cheating by any means will cause the student failure and he/she must re-study the course |
| 6. | Plagiarism: Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules. |

Course Plan (Syllabus)

| I. Information about Faculty Member Responsible for the Course: | | | | | | | |
|---|--------------|--------------|-----|-----|-----|-----|-----|
| Name of Faculty Member | Prof. | Office Hours | | | | | |
| Location & Telephone No. | | SAT | SUN | MON | TUE | WED | THU |
| E-mail | @hotmail.com | | x | | | | |

| II. Course Identification and General Information: | | | | | | |
|--|---|----------------------------|---------|-----|--------|-------|
| 1. | Course Title: | Medical Technology | | | | |
| 2. | Course Number & Code: | MCCN01 | | | | |
| 3. | Credit hours: 3 | C.H | | | | |
| | | Th. | Seminar | Pr. | F. Tr. | Total |
| | | 2 | - | 1 | - | 3 |
| 4. | Study level/year at which this course is offered: | First year/ first semester | | | | |
| 5. | Pre –requisite: | | | | | |
| 6. | Co –requisite : | - | | | | |
| 7. | Program (s) in which the course is offered | Critical care nursing | | | | |
| 8. | Language of teaching the course: | English | | | | |
| 9. | System of Study: | Semester system | | | | |
| 10 | Mode of delivery: | Full time | | | | |
| 11 | Location of teaching the course: | Faculty of Nursing | | | | |

| III. Course Description: | |
|---|--|
| <p>The course focuses on understanding and management of Arterial Lines; Central venous Lines; Pulmonary Artery Catheters, Pulse Oximetry SpO₂; Capnography - EtCO₂, intercostal catheters & Underwater Sealed Drainage. Defibrillation: Manual External & Automated external defibrillation (AED), cardiac monitors, ventilators (SIMV, CMV, weaning from ventilator), continuous positive airway pressure (CPAP), bi-level positive airway pressure (BiPAP), infusion pumps, syringe pumps, , intra-aortic balloon therapy, heart lung machine, heart mate, pulse contour cardiac output (PICCO), active humidifiers, Baer Hugger & blood warmer, cell saver-autologous blood recovery system, Intracranial pressure monitoring, pacemakers and ICD, prisma dialysis machine , extracorporeal membrane oxygenation (ECMO) and plasmapheresis.</p> | |

IV. Intended learning outcomes (ILOs) of the course:

1. Understanding and management of Arterial and Central Lines, Pulse Oximetry SpO₂ and Capnography
2. Understanding and management of Infusion, Underwater Sealed Drainage and Hemodynamic monitoring Defibrillation, Baer Hugger & amp, Intracranial pressure monitoring
3. Interpretation and management of Basics of ECG
4. Explain when mechanical ventilation is needed and how the ventilator modes and settings are determined.
5. Recognize components and normal values of the conduction system and the related PQRST of the ECG tracing and hemodynamic monitoring.
6. Differentiate normal and abnormal values for ABG analysis; respiratory acidosis, respiratory alkalosis, metabolic acidosis and metabolic alkalosis
7. Apply leads for cardiac monitoring, interpret and monitor cardiac rhythms
8. Monitor hemodynamic status, and recognize signs and symptoms of hemodynamic instability
9. Manage patients requiring 12-lead ECG, arterial catheter, cardiac catheterization, cardioversion, central venous pressure monitoring, defibrillation and invasive hemodynamic monitoring.
10. Apply pulmonary therapeutic interventions related to mechanical ventilation such as airway clearance, intubation, weaning, extubation, respiratory monitoring devices, therapeutic gases, thoracentesis and tracheostomy with mechanical ventilation.

V. Course Content:

Distribution of Semester Weekly Plan of Course Topics/Items and Activities.

A – Theoretical Aspect:

| Order | Topics List | Week Due | Contact Hours |
|-------|---|----------|---------------|
| 1 | Arterial and Central Lines | 1 | 2 |
| 2 | Pulse Oximetry SpO ₂ and Capnography | 2 | 2 |
| 3 | Infusion | 3-4 | 4 |
| 4 | Underwater Sealed Drainage. | 5 | 2 |
| 5 | Hemodynamic monitoring | 6-7 | 4 |
| 6 | Midterm exam | 8 | 2 |
| 7 | Cardiac Dysrhythmias | 9-11 | 6 |
| 8 | Defibrillation | 12 | 2 |
| 9 | Baer Hugger & amp | 13 | 2 |

| | | | |
|--|----------------------------------|-----------|-----------|
| 10 | Intracranial pressure monitoring | 14 | 2 |
| 11 | Mechanical Ventilation | 15-16 | 4 |
| 12 | Final exam | 17 | 2 |
| Number of Weeks /and Units Per Semester | | 16 | 32 |

| B - Clinical Aspect: | | | | |
|--|--|-----------------|---------------|-------------------|
| Order | Tasks/ Experiments | Number of Weeks | Contact hours | Learning Outcomes |
| 1 | <ul style="list-style-type: none"> Arterial Lines Central venous Lines Pulmonary Artery Catheters | 1-2 | 6 | c4 |
| 2 | Pulse Oximetry SpO2 Capnography | 3-4 | 6 | c4 |
| 3 | Infusion | 5 | 3 | c4 |
| 4 | Underwater Sealed Drainage. | 6 | 3 | c4 |
| 5 | Hemodynamic monitoring | 7-8 | 6 | c4 |
| 6 | Dysrhythmia | 9-11 | 12 | c4 |
| 7 | Defibrillation | 12 | 3 | c4 |
| 8 | Baer Hugger & amp | 13 | | c4 |
| 9 | Intracranial pressure monitoring | 14 | | c4 |
| 10 | Mechanical ventilation | 15-16 | 6 | c4 |
| 11 | Final clinical exam | 17 | 3 | c2,c4.c5 |
| Number of Weeks /and Units Per Semester | | 17 | 51 | - |

VI. Teaching strategies of the course:

1. Lecture - Discussion
2. Demonstration

VII. Assignments:

| No | Assignments | Aligned CILOs(symbols) | Week Due | Mark |
|----|-----------------|------------------------|----------|------|
| 1 | Write about EEG | a1,a4,b2 | 5-10 | 10 |

| VIII.Schedule of Assessment Tasks for Students During the Semester | | | | | |
|---|--------------------|---|------------|--------------------------------|----------------------------------|
| No. | Assessment Method | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
| 1 | Student assignment | 5th - 12th week | 10 | 10 % | a1,a4,b2 |
| 2 | Presentation | 4 st - 14 th week | 20 | 20 % | a1,a4,b2 |
| 3 | Mid-term exam | 7th or 8th week | 20 | 20% | a1,a4,b2 |
| 4 | Final exam | 16th-17th week | 50 | 50 % | a1,a4,b2 |
| Total Theory Weight | | | 100 | 100% | |

| Clinical part | | | | | |
|-------------------------------|---------------------------|---|------------|--------------------------------|----------------------------------|
| Assessment | Type of Assessment Tasks | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
| 1 | Attendance and Attitude | 14 th week | 10 | 10% | a5,c2,c3,c4,c5 |
| 2 | Semester work | 1 st - 14 th week | 50 | 10% | a5,c2,c3,c4,c5 |
| 3 | Final exam (theory/oral) | 15 th week | 15 | 50% | a5,c2,c3,c4,c5 |
| 4 | Final exam (practical) | 16 th -17 th week | 25 | 30% | a5,c2,c3,c4,c5 |
| Total Practical Weight | | | 100 | 100% | |

| VIII. Learning Resources: | |
|---|---|
| 1- Required Textbook(s) | |
| | 1. Joseph M.C., Vetta R.W. , Taylor R.K. Critical care Medicine . 2 nd .2011 |
| 2- Essential References. | |
| | 1. Shoemader .woliam C. et al Text book of critical care. W B Saunders Company Philadelphia 2007. |
| 3- Electronic Materials and Web Sites etc. | |
| | http://www.google.com |

IX. Course Policies:

| | |
|----|---|
| 1. | Class Attendance: At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam |
| 2. | Tardy: any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent. |
| 3. | Exam Attendance/Punctuality: Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent. |
| 4. | Assignments & Projects: Assignments and projects will be assessed individually unless the teacher request for group work |
| 5. | Cheating: Cheating by any means will cause the student failure and he/she must re-study the course |
| 6. | Plagiarism: Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules. |