Las Positas College
3000 Campus Hill Drive
Livermore, CA 94551-7650
(925) 424-1000
(925) 443-0742 (Fax)

Course Outline for EMS 52

EMT-P PHARM AND AIRWAY

Effective: Fall 2010

I. CATALOG DESCRIPTION:
EMS 52 — EMT-P PHARM AND AIRWAY — 4.00 units

Basic principles of pharmacology, drug classifications, action of drugs, clinical uses, administration of drugs, and advanced airway techniques. Emphasis on drugs and solutions used in the pre-hospital emergency environment by paramedics. Prerequisite: Emergency Medical Services (completed with a grade of "C" or higher). 3 hours lecture, 3 hours laboratory.

3.00 Units Lecture 1.00 Units Lab

Prerequisite
EMS 51 - EMT-P Human Systems
with a minimum grade of C

Grading Methods:
Letter Grade

Discipline:

	MIN
Lecture Hours:	54.00
Lab Hours:	54.00
Total Hours:	108.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. EMS51
1. recognize the anatomy and function of the upper airway, heart, vessels, blood, lungs, skin, muscles, and bones as the foundation of emergency care and compare and contrast the how constituent systems' injury or failure contributes to an emergency disease process
2. apply fundamental knowledge of the anatomy and function of all human systems to the practice of EMS
3. interpret knowledge of the anatomy and physiology of the airway, respiratory and circulatory systems to the practice of EMS and management of respiratory and cardiac emergencies
4. categorize the anatomy and physiology of all human systems that can produce an emergent medical condition
5. use foundational anatomical and medical terms and abbreviations in written and oral communication with colleagues and other health care professionals
6. demonstrate an understanding of the principles of pathophysiology by developing a written report on each of the emergent medical conditions presented in a case study

IV. MEASURABLE OBJECTIVES:

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

A. Pharmacology
1. create a treatment plan intended to mitigate emergencies and improve the overall health of the patient using knowledge of emergency medical pharmacology
2. compare and contrast the names, mechanism of action, indications, contraindications, complications, routes of administration, side effects, interactions, dose, and any specific administration considerations, for all of the emergency medications and intravenous fluids utilized by the local training institution. Individual training programs have the authority to add any medication used locally by paramedic providers
3. apply to patient assessment and management, a fundamental knowledge of the medications carried by paramedics that may be administered to a patient during an emergency
4. demonstrate knowledge of the following topics:, Medication safety, medication legislation, medication naming, classifications and schedules
5. summarize general principles of pharmacokinetics
6. articulate general principles of: Medication storage and security, Autonomic pharmacology, Metabolism and excretion, Mechanism of action, Phases of medication activity, Medication response relationships
7. give various examples of medication interactions and medication toxicity
8. describe medication routes of administration
9. list all medications within the scope of practice of the paramedic and techniques of administering said medications to a patient

10. list each of the following topics within the scope of practice of the paramedic: Names of medication, Actions of medication, Indications of medication, Contraindications and Complications of medication, Side effects, Interactions and, Dosages for the medications Administered
11. calculate and regulate the flow rate for an IV infusion given the volume, drop factor, and time frame
12. re-establish an IV infusion that becomes compromised
13. remove air from IV tubing
14. discontinue an IV infusion
15. calculate the volume of medication to be administered when given an ordered dosage
16. read drug container labels, and identify components (i.e. name, concentration, expiration date, etc.)
17. withdraw solutions from ampoules and vials with an appropriately sized syringe
18. assemble a preloaded syringe (e.g., Bristoject, Abbojet, preload cartridges, etc.)
19. correctly administer an IV push medication
20. administer IM injections via the: dorsogluteal, ventrogluteal, vastus lateralis, and deltoid sites
21. administer subcutaneous injections
22. calculate, mix, and administer an IV medication infusion using microdrip Tubing

B. Airway Management
1. using a comprehensive knowledge of anatomy, physiologies, and pathophysiology of the respiratory system, construct an assessment to develop and implement a treatment plan with the goal of assuring a patent airway, adequate mechanical ventilation, and respiration for patients of all ages
2. demonstrate knowledge and possesses a breadth of knowledge within the scope of practice of the paramedic on the following topics: Airway anatomy, Airway assessment, Techniques of assuring a patent airway
3. demonstrate knowledge of the following topics: Anatomy of the respiratory system, physiology, and pathophysiology of respiration of pulmonary ventilation, oxygenation and respiration, assessment and management of adequate and inadequate respiration, supplemental oxygen therapy
4. discuss the following topics: Assessment and management of adequate and inadequate ventilation, artificial ventilation, Minute ventilation, Alveolar ventilation, Effect of artificial ventilation on cardiac output
5. describe In step-by-step fashion, the generic procedure of rapid sequence Intubation
6. perform the suctioning technique in the following situations: Oropharyngeal, Endotracheal, Nasopharyngeal, Tracheotomy
7. secure a patent airway using an endotracheal tube, King LT airway or other supraglottic airway device
8. maintain the patient's airway and/or provide ventilations using the: Oropharyngeal airway, Positive pressure ventilator, nasopharyngeal airway, endotracheal tube, Pocket mask, Laryngeal mask assembly, Bag-valve-mask

V. CONTENT:

A. Medication Safety

B. Medication Legislation
1. Pure Food and Drug Act
2. Federal Food, Drug and Cosmetic Act
3. Harrison Narcotic Act
4. Controlled Substances Act
5. Drug Enforcement Agency
6. Development of Pharmaceuticals

C. Naming
1. Chemical
2. Generic
3. Propriety/Trade
4. Official
5. Authoritative sources of drug information

D. Classifications
1. Body System
2. Class of Agent
3. Mechanism of Action
4. Classifications by Body System

E. Schedules
1. Controlled Substances Act

F. Drug Storage and Security
1. Factors affecting Drug Potency
2. Controlled Substances

G. Phases of Medication Activity

H. Medication Interactions
1. Intestinal Absorption
2. Competition for Plasma Protein Binding
3. Biotransformation
4. Drug Metabolism
5. Renal Excretion
6. Drug – Drug Interaction

I. Toxicity

J. Drug Terminology
1. Antagonism
2. Bolus
3. Contraindications
4. Cumulative Action
5. epressant
6. Habituation
7. Hypersensitivity
8. Idiosyncrasy
9. Indication
10. Potentiation
11. Refractory
12. Side Effects
13. Stimulant
14. Synergism
15. Therapeutic action
16. Tolerance
17. Untoward effect

K. Sources of Drugs
1. Inorganic
2. Organic
3. Chemical
4. Genetic

5. Drug Forms

L. Pharmacological concepts
   1. Pharmacokinetics
   2. Pharmacodynamics

M. Medication Administration
   1. Routes of Administration
      a. Alimentary Tract
      b. Parenteral
   2. Administration of Medication to a Patient
      a. The “Rights” of Drug Administration
      b. Drug Dose Calculations
      c. Techniques of Medication Administration (Advantages, Disadvantages, Techniques)
      d. Reassessment
      e. Documentation
   3. Standardization of Drugs
      a. Techniques to assure purity and potency
      b. Generic Drugs
   4. Medication Classifications
      a. Phelebotomy
      b. Transfusion

N. Medications
   1. Specific Medications
      a. Activated Charcoal
      b. Adenosine
      c. Albuterol
      d. Amiodarone
      e. Amyl Nitrite
      f. Aspirin
      g. Atropine
      h. Dextrose (50%, 25%, 10%)
      i. Diazepam
      j. Diltiazem
      k. Diphenhydramine HCl
      l. Dopamine
      m. Epinephrine
      n. Fentanyl
      o. Glucagon
      p. Glucose
      q. Intravenous Fluids
      r. Ipratropium
      s. Lidocaine
      t. Lorazepam
      u. Magnesium
      v. Midazolam
      w. Morphine
      x. Naloxone
      y. Nitroglycerin
      a`. Oxygen
      aa. Oxytocin
      ab. Promethazine HCl
      ac. Thiamine

O. Airway Management
   1. Airway Anatomy
      a. Sinuses
      b. Upper Airway Tract
      c. Jugular notch
      d. Lower Airway Tract
      e. Support Structures
   2. Airway Assessment
      a. Purpose
      b. Procedure
      c. Anticipating the difficult airway
   3. Techniques of assuring a patent airway
      a. Manual airway maneuvers
      b. Mechanical airway devices
      c. Relief of Foreign Body Airway Obstruction
      d. Blind insertion airway devices
      e. Endotracheal intubation
      f. Percutaneous cricothyrotomy

P. Consider age-related variations in pediatric and geriatric patients

Q. Anatomy of the Respiratory System
   1. Additional Respiratory System Anatomy
   2. Physiology of Respiration
   3. Control of Respiration
   4. Mechanics of Respiration
   5. Blood volume circulation disturbances due to Cardiac, Trauma, Systemic
   6. Vascular Resistance
   7. Cardiac output and the role in adequate circulation maintenance
   8. Buffer systems

R. Pathophysiology of Respiration
   1. Pulmonary ventilation
   2. Oxygenation
   3. Respiration
   4. Rapid ventilation, exhaustion, dead space air movement
   5. Mechanical ventilation
   6. Breathing against an elevated diaphragm
   7. Decreases in lung compliance such as pneumonia, emphysema, and trauma
   8. Ventilation-perfusion mismatch
   9. Disruptions in oxygen transport associated with diminished oxygen carrying
   10. Disruptions in effective circulation

11. Disruptions at the cellular level

S. Assessment of Adequate and Inadequate Respiration
   1. Capnometry/Capnography

T. H. Management of Adequate and Inadequate Respiration
   1. Respiratory Compromise

U. I. Supplemental Oxygen Therapy
   1. Review and elaborate on the oxygen delivery devices used by EMRs, EMTs and AEMTs
   2. Oxygen administration and the patient with hypercapnia

V. Age-Related Variations in Pediatric and Geriatric Patients

W. Comprehensive ventilation assessment

X. Review of ventilation devices used by EMRs, EMTs and AEMTs

Y. Assisting patient ventilations

VI. METHODS OF INSTRUCTION:

A. **Lecture** -
B. **Discussion** - Group Discussion
C. **Lab** - Skills Laboratory
D. Learning Resource Center use
E. Simulated problem solving
F. Oral and written reports
G. Reading Assignments
H. **Audio-visual Activity** - Selected Video and AV Aids

VII. TYPICAL ASSIGNMENTS:

A. Complete workbook exercises after completing lecture readings.
B. Present simulated patient case history reports.
C. Prepare a class presentation on assigned lecture topics related to course.
D. Work in groups simulating patient care skills on mannequins.

VIII. EVALUATION:

A. **Methods**

1. Other:
   a. Multiple Choice Examinations, including a Midterm and Final Examination
   b. Short Essay Examinations
   c. Midterm Examination
   d. Final Examination
   e. Oral Presentations
   f. Practical Skills Examinations using national standard score sheets

B. **Frequency**

1. Recommend weekly examinations
2. Homework assigned for each topic completed
3. Midterm and Final Exam

IX. TYPICAL TEXTS:

1. Bryan E. Bledsoe et. al. *Paramedic Care; Principles & Practice, Vol. 1-5.* 3rd ed., Brady-Prentice Hall Health, 2008.
2. Bryan E. Bledsoe et. al. *Student Workbook for Paramedic Care; Principles & Practice, Vol. 1-5.* 3rd ed., Brady-Prentice Hall Health, 2008.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. Stethoscope
B. Penlight