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## Course Outline for EMS 56

### EMT-P TRAUMA AND SHOCK

Effective: Spring 2011

#### I. CATALOG DESCRIPTION:

EMS 56 — EMT-P TRAUMA AND SHOCK — 4.00 units

Overview of prehospital evaluation and management of patients experiencing trauma emergencies, including monitoring and interpretation of ECG's, placement of intravenous lines. Comprehensive treatment through the use of advanced airway management, fluid resuscitation and shock treatment in the clinical setting. Supervised clinical sessions at a hospital emergency department, labor and delivery suite, pediatric clinic, to include exposure to emergency, cardiac, surgical, obstetric, and pediatric patients with a clinical preceptor. Prerequisite: EMS 55 (completed with a grade "C" or higher). 3 hours lecture, 3 hours laboratory.

3.00 Units Lecture 1.00 Units Lab

#### Prerequisite

EMS 55 - EMT-P Cardiac and Resp Systems  
with a minimum grade of C

#### Grading Methods:

Letter Grade

#### Discipline:

	MIN
<b>Lecture Hours:</b>	54.00
<b>Lab Hours:</b>	54.00
<b>Total Hours:</b>	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. EMS55

1. formulate a treatment plan for managing cardiac arrest and peri-arrest states
2. demonstrate knowledge of the underlying causes and pathophysiology of shock, respiratory failure or arrest with an emphasis on early intervention to prevent arrest
3. summarize the underlying anatomy, physiology, epidemiology, pathophysiology, psychosocial impact, presentations, and prognosis of the following topics: Acute coronary syndrome, including Angina pectoris, Myocardial infarction, Heart failure, Non-traumatic cardiac tamponade, Hypertensive emergencies, Cardiogenic shock, Vascular disorders including Abdominal aortic aneurysm, Arterial occlusion, Venous thrombosis • Aortic aneurysm/dissection, Thromboembolism, Cardiac rhythm disturbances
4. formulate treatment plans for the following topics: Acute coronary syndrome, including Angina pectoris, Myocardial infarction, Heart failure, Non-traumatic cardiac tamponade, Hypertensive emergencies, Cardiogenic shock, Vascular disorders including Abdominal aortic aneurysm, Arterial occlusion, Venous thrombosis, Aortic aneurysm/dissection,, Thromboembolism, Cardiac rhythm disturbances
5. differentiate the physiology and pathophysiology of infectious diseases of the heart, and congenital abnormalities
6. discuss the underlying anatomy, physiology, pathophysiology, assessment, and management of: Epiglottitis, Spontaneous pneumothorax, Pulmonary edema, Asthma, Chronic obstructive pulmonary disease, Environmental/industrial exposure, Toxic gas, Pertussis, Cystic fibrosis, Pulmonary embolism
7. discuss the underlying anatomy, physiology, pathophysiology, assessment, and management of respiratory infections, both viral and bacterial
8. demonstrate knowledge of respiratory neoplasm and cystic fibrosis
9. discuss the underlying anatomy, physiology, epidemiology, pathophysiology, psychosocial impact, presentations, prognosis, and management of common and major diseases of the eyes, ears, nose, and throat
10. discuss the underlying anatomy, physiology, epidemiology, pathophysiology, psychosocial impact, presentations, prognosis, and management of common or major non-traumatic musculoskeletal disorders
11. demonstrate knowledge of the following conditions: Disorders of the spine, Joint abnormalities, Muscle abnormalities
12. perform the following procedures under the guidance of a clinical preceptor Intraosseous insertion of an IO needle, enteral and parenteral administration of approved prescription medications, Access indwelling catheters and implanted central IV ports, administer medications by IV infusion, Maintain infusion of blood or blood products, perform blood sampling, thrombolytic initiation, administer physician approved medications
13. identify assessment findings in a patient presentation with principles of epidemiology and pathophysiology to formulate a field

impression and implement a treatment plan for a patient with a cardiovascular complaint

#### IV. MEASURABLE OBJECTIVES:

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

- A. discuss the underlying causes and pathophysiology of traumatic injuries and shock states
- B. demonstrate knowledge of the causes and pathophysiology of shock, respiratory failure or arrest with an emphasis on early intervention to prevent arrest
- C. perform the following procedures under the guidance of a clinical preceptor Intraosseous insertion of an IO needle, enteral and parenteral administration of approved prescription medications, Access indwelling catheters and implanted central IV ports, administer medications by IV infusion, Maintain infusion of blood or blood products, perform blood sampling, thrombolytic initiation, administer physician approved medications, place a Morgan Lens
- D. identify assessment findings of a simulated patient presentation and formulate a field treatment plan for a patient with a major traumatic systems and minor traumatic injuries
- E. formulate a comprehensive treatment/disposition plan for an acutely injured patient

#### V. CONTENT:

- A. Kinematics of trauma
  - 1. Definition
- B. Multi-System Trauma
  - 1. Definition
  - 2. The golden principles of out of hospital trauma care
  - 3. Critical Thinking in multi-system trauma care
- C. Specific injuries related to multi system trauma
  - 1. Blast injuries
- D. Ethical Issues in Resuscitation
  - 1. Ethics Foundation
  - 2. Withholding Resuscitation Attempts
  - 3. Withdrawing Resuscitation
  - 4. Providing Emotional Support for Family
  - 5. Organ and Tissue Donation
- E. Pre-Morbid Conditions
  - 1. Healthy Patient (Adult)
  - 2. Unhealthy Patient (Adult)
- F. Anatomy and physiology review
  - 1. Respiratory system
  - 2. Cardiovascular system
- G. Physiology of normal blood flow
  - 1. Generally speaking, the heart pumps blood out of the left ventricle, around the circulatory system and back to the right side of the heart.
  - 2. The negative intrathoracic pressure created by normal ventilation assists venous return.
- H. Physiology of blood flow during CPR
  - 1. Heart Pump Theory
  - 2. Thoracic Pump Theory
  - 3. Harder and faster compressions increase the pressure to a greater degree
  - 4. Negative Intrathoracic Pressure
- I. Cardiac Arrest
  - 1. Epidemiology
  - 2. Pathophysiology
- J. Resuscitation
  - 1. System components to maximize survival
  - 2. Basic Cardiac Life Support (Refer to current American Heart Association guidelines)
  - 3. Alternative CPR Techniques (i.e. Interposed Abdominal Compression)
  - 4. Airway Control and Ventilation
  - 5. Chest compressions
- K. Automated external defibrillation (Refer to current American Heart Association guidelines)
  - 1. Adult sequence
  - 2. Child sequence
  - 3. Infant sequence
  - 4. Special situations
- L. Advanced Life Support - Refer to the current American Heart Association guidelines
  - 1. Electrical therapies
  - 2. Intravenous access
  - 3. Arrest rhythms
  - 4. Non-arrest rhythms
- M. Special arrest and peri-arrest situations - Refer to the current American Heart Association guidelines
  - 1. Electrolyte abnormalities
  - 2. Toxic exposure
  - 3. Drowning
  - 4. Hypothermia
  - 5. Near-Fatal Asthma
  - 6. Anaphylaxis
  - 7. Traumatic cardiac arrest
  - 8. Cardiac arrest associated with pregnancy
  - 9. Electric shock and lightning strikes
- N. Postresuscitation support - Refer to the current American Heart Association guidelines
  - 1. Return of spontaneous circulation (ROSC)
- O. Shock
  - 1. Definition
  - 2. Anatomy and physiology review
  - 3. Essential components for normal perfusion
  - 4. Tissue hypoperfusion
  - 5. Physiologic response to shock
  - 6. Pancreas
  - 7. Stages of shock
  - 8. Specific types of shock
  - 9. Patient Assessment
  - 10. Management
  - 11. Devices to assist circulation

- P. Age-related variations
  - 1. Pediatrics
  - 2. Geriatrics
- Q. Trauma patients
  - 1. Identification and Categorization of Trauma Patients
    - a. Entry-level students need to be familiar with:
  - 2. Incidence/significance of Trauma
    - a. Mortality -- Incidence of death
    - b. Morbidity -- New cases where death is not an outcome, nonfatal injury
    - c. Years of Life Lost -- Subtract age of death from life expectancy
    - d. Deaths due to trauma in the United States
  - 3. Trauma System
    - a. Components -- Hospital categorizations
    - b. Levels and qualifications
    - c. Transport considerations
  - 4. Types of Injury
    - a. Blunt Trauma
    - b. Penetrating trauma
  - 5. Trauma Assessment
    - a. Major components of the patient assessment
    - b. Mechanism of Injury (MOI)
    - c. Primary Survey
    - d. Secondary Assessment - Head-to-toe physical exam (Review)
    - e. chest for auscultation
    - f. Secondary Assessment
  - 6. Role of Documentation in Trauma
    - a. Topical Anatomy
    - b. Scenario sections of Patient Care Reports
  - 7. Trauma Scoring Scales
  - 8. Trauma Center Designations
  - 9. Transfer of patients to the most appropriate hospital
- R. Bleeding and Shock
  - 1. Incidence
    - a. Mortality and morbidity
    - b. Populations at risk
  - 2. Anatomy and function
    - a. Respiratory system
    - b. Circulatory system
    - c. Central nervous system
  - 3. Pathophysiology
    - a. Review knowledge from previous levels
    - b. Centers around
    - c. Organ involvement in shock
    - d. Classifications of Shock
    - e. Compensatory Mechanisms in Shock
    - f. Decompensation in Shock
    - g. Complications of Shock
  - 4. Assessment consideration in Shock
    - a. Review knowledge from previous levels
    - b. Scene size-up
    - c. Shock Management strategies and considerations
    - d. Scene safety
    - e. Body substance isolation precautions
    - f. Restore Tissue oxygenation
  - 5. Bleeding considerations
    - a. Physiology and Pathophysiology
    - b. Assessment of Bleeding
    - c. Management considerations in bleeding
- S. Chest Trauma
  - 1. Incidence of chest trauma
    - a. Morbidity/mortality
    - b. Prevention strategies
  - 2. Traumatic Aortic Disruption
    - a. Pathophysiology
    - b. Specific Assessment considerations
    - c. Management considerations
  - 3. Pulmonary Contusions
    - a. Pathophysiology
    - b. Management Considerations
  - 4. Blunt Cardiac Injury
    - a. Pathophysiology
    - b. Assessment considerations
    - c. Management Considerations
  - 5. Hemothorax
    - a. Pathophysiology
    - b. Specific Assessment considerations
    - c. Specific Management consideration
  - 6. Pneumothorax
    - a. Open
    - b. Simple
    - c. Tension
  - 7. Cardiac Tamponade
    - a. Pathophysiology
    - b. Specific Assessment considerations
    - c. Specific Management considerations in cardiac tamponade
  - 8. Rib fractures
    - a. Pathophysiology
    - b. Assessment
    - c. Management
  - 9. Flail Chest

- a. Pathophysiology
  - b. Assessment
  - c. Management
- 10. Commotio cordis
  - a. Pathophysiology
  - b. Assessment
  - c. Management
- 11. Tracheobronchial disruption
  - a. Pathophysiology
  - b. Assessment
  - c. Management
- 12. Diaphragmatic rupture
  - a. Pathophysiology
  - b. Assessment
  - c. Management
- 13. Traumatic asphyxia
  - a. Pathophysiology
  - b. Assessment
  - c. Management
- 14. Pediatric considerations in chest trauma
  - a. Review of anatomical differences
  - b. Review of physiological differences
  - c. Review of differences in mechanism of injury
  - d. Specific management considerations
  - e. Management Considerations
  - f. Geriatric considerations in chest trauma
- T. Abdominal and Genitourinary Trauma
  - 1. Incidence
    - a. Morbidity/Mortality
    - b. Prevention strategies
  - 2. Vascular injury
    - a. Pathophysiology
    - b. Special management considerations
  - 3. Solid and hollow organ injuries
    - a. Pathophysiology
    - b. Special Assessment Findings
  - 4. Blunt vs. Penetrating Abdominal Injury
    - a. Pathophysiology
    - b. Special Assessment Findings
    - c. Special management considerations
  - 5. Evisceration
    - a. Pathophysiology
    - b. Special Assessment Findings
    - c. Special management considerations
  - 6. Retroperitoneal injury
    - a. Pathophysiology
    - b. Special Assessment Findings
    - c. Special management considerations
  - 7. Injuries to external genitalia
    - a. Pathophysiology
    - b. Special Assessment Finding
    - c. Special management considerations
  - 8. Age-related variations
    - a. Pediatrics
    - b. Geriatrics

#### VI. METHODS OF INSTRUCTION:

- A. Simulated problem solving
- B. Oral and written reports
- C. Reading Assignments
- D. Learning Resource Center use
- E. **Audio-visual Activity** - Selected Video and AV Aids
- F. **Lecture** -
- G. **Discussion** - Group Discussion
- H. **Lab** - Skills Laboratory
- I. Preceptor monitored medical procedure training in a clinical settings

#### 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.

#### VIII. EVALUATION:

##### A. **Methods**

###### 1. Other:

- a. Multiple Choice Examinations, including a Midterm and Final Examination
- b. Short Essay Examinations
- c. Oral Presentations
- d. Skills Laboratory Evaluation using standardized NREMT scoring sheets

##### B. **Frequency**

- 1. Recommend weekly examinations
- 2. Homework assigned as each topic completed
- 3. Midterm and Final Examination at end of Course

#### 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
- C. Clinical Rotation garment approved by Clinical site