SRG 123 - BIOMED SCIENCES AND MIS

Course Description

Students in this course are introduced to the basic concepts of physics to include the elements of motion, energy, light, sound and electricity and how they apply to surgical practice. Further study will include aspects of minimally invasive surgery including laparoscopy and robotic surgery. Students will also be introduced to the cases performed in interventional radiology and how they are integrated within surgical practice. The course will conclude with the study of diagnostic interventions integral in surgical practice as well as diagnosing pathologies preoperatively. Group 2 course.

Credit Hours

1.5

Contact Hours

1.5

Lecture Hours

1.5

Required Prerequisites

SRG 121, SRG 121L, SRG 122 may be taken concurrently

Course Learning Outcomes

Knowledge:

- Describe the importance of atoms, molecules, elements, and matter.
- Describe the elements of motion and types of energy.
- List the properties of waves, light, sound and electricity and their applications in surgery.
- Identify the methods of heat transfer and how they relate to patient safety.
- Identify the physical components of a computer as well as how computer networks, systems, and the internet are utilized within the perioperative environment.
- Describe the preparation of the patient for MIS.
- Describe the function of each component of the imaging equipment used in MIS.
- Describe the surgical technique used for insufflation in laparoscopy including the trocar-cannula system and risks associated with insufflation.
- Describe the specific electrosurgical risks of direct and capacitative coupling.
- Describe the structure and function as well as the proper protocol for processing rigid and flexible endoscopes.
- Describe the concept of Cartesian geometry as it applies to robot design.
- Describe robotic movements and classification.
- Identify training resources for robotic surgery.
- Identify the three main components of robotic surgery and describe their function.
- Identify the methods of decontaminating and reprocessing robotic instruments and scopes.
- Describe the roles of team members during robotic surgery.
- Identify the specialty equipment and supplies used in the interventional radiology (IR) setting and describe indications for their use.
- Explain ALARA and the strategies that support it.
- Categorize the medications and injectable agents used in the IR setting and list the indications for their use.
- Explain the mechanism of action for intravenous contrast media and describe the risk factors for contrast media-induced nephrotoxicity and allergic reactions.
- Describe the Seldinger technique.
- Categorize the types of IR procedures and list the indications for each.
- Describe all commonly used procedures for diagnostic imaging, blood and urine tests, patient vital signs, and electrocardiograph.
- Describe the effects of malignancy on the body and the methods of cancer screening including tissue biopsy.

Application:

- Analyze the advantages and disadvantages of minimally invasive surgery utilizing a case study scenario with various patient pathologies and anatomical challenges.
- Analyze a clinical scenario involving the need to troubleshoot robotic equipment during a surgical case to determine the appropriate action steps.
- Analyze a clinical scenario for a contrast reaction to determine appropriate action steps.
- Analyze a scenario to determine the most appropriate risk-reduction or patient education strategies for patients undergoing IR procedures.
- Accurately document vital sign measurements.

Integration:

- Connect the relationship between technology and medicine.
- Compare and contrast the role of the surgical technologist in a robotic case versus an open case along with the differing skill components.
- Compare and contrast the roles of the surgical technologist in the operating room with the roles of the CST in IR.
- Relate the traditional role of IR in the operating room with the merging of the two in hybrid operating rooms.

Human Dimension:

- Consider patient safety during minimally invasive cases.

Caring - Civic Learning:

- Engage with fellow students to relay the importance of equipment safety within the surgical environment to prevent patient injury during surgery.

Learning How to Learn:

- Troubleshoot technical difficulties within multiple biomedical equipment within the operating room to seek out resources within the department for assistance.
- Work cooperatively with varying department personnel in the utilization of advanced technical equipment.