

Principles of Surgery VETM*3510

Fall 2017 - Winter 2018

0.25 Credits

Calendar

Basic and more advanced principles of veterinary surgery are presented. More specifically, the lecture topics include patient and surgeon preparation, asepsis in surgery, tissue handling, instrumentation & suturing. In addition to surgical principles, this course introduces the techniques for abdominal exploration and abdominal organ biopsy, principles of orthopedic surgery and bandaging techniques, principles of oncologic surgery as well as ovariohysterectomy and castration procedures.

This course consists of lecture sessions, independent website study with web-based assignments, a mastery list assignment as well as 6 practical laboratory sessions.

Course

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Instructor

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Administrative

For questions regarding academic consideration, continuation of study, academic misconduct, safety, confidentiality, and experiential learning involving use of animals, please refer to the Phase information on the OVC website.

Course

To prepare undergraduate veterinary students for Phase 3 surgical lectures and surgical training laboratories and Phase 4 clinical rotations by introducing basic and more advanced surgical concepts and skills.

Instruction will consist of formal lectures, self-directed website study, self-directed suture exercises, completion of a mastery list and 6 practical laboratory sessions.

Assigned

A surgery website (<http://www.uoguelph.ca/vetsurgery/>) has been designed to provide students with didactic information, images and current video clips to enhance learning and complement the topics discussed in class. A variety of information is available on this site so a 'Principles of surgery' map is provided to help you navigate through the sections that are required for this course. **Independent review and study of the relevant website sections as well as completion of the online quizzes (on Courselink) are mandatory and must be completed as scheduled in order to prepare for lectures or laboratories. You will be provided with 14 hours of independent time in your schedule to perform these tasks along with some of the mastery list work. These hours are strategically placed in your schedule for online review prior to specific laboratories and we encourage you to use them as such as you will get more out of each lab if you come prepared!**

Other materials found on this website are available for extra-curricular review – you are welcome to explore but do not need to review all of it right now!

Suture Mastery List

Completion of the self-directed 'Suture Mastery List' will allow you to practice your suturing techniques in preparation for the practical laboratory sessions. You are expected to practice a series of suture patterns on your DASIE using the surgery website as a reference – you can work in teams if you wish. Once you feel comfortable enough performing each suture pattern, find a classmate and perform the suture patterns together; this will allow you to 'critique' each other's technique and possibly help each other with any difficulties. Veterinarians will assist with any questions or issues you have with

instrument handling or basic suturing technique during the laboratory sessions. The 'Suture Mastery List' is provided on Courouselink. The form must be signed off by a classmate who witnesses successful completion of the suture tasks. **This form must be completed and should be handed to the instructor at the start of Laboratory 3.**

Surgical Asepsis Mastery List

The surgical asepsis mastery list contains a list of procedures that should be observed by each student. The objective of this exercise is to familiarize the student with common surgical preparation techniques and to give the student the opportunity to see these procedures being performed on a 'real-life' patient in a clinical context. It also allows students to witness how the phase 3 spay and neuter labs run. **This task can be performed during any 3rd year spay / neuter session at the CCRF (Tuesdays & Thursdays from Oct 12th to Nov 30th & Jan 9th to March 29th at ~8am). Allow 1 to 1.5 hours for your visit at the CCRF. **Attendance at the CCRF is limited to 5 people per session due to space restrictions. A sign up sheet is available on Signupgenius for the CCRF – you will get an email! Please sign up early and plan ahead for a date that is convenient for you and fits in your class schedule.**

Alternatively, the Asepsis Mastery List can be completed in the small animal clinic or during your PHC rotation. Anesthetic induction times in the clinics are not fixed and happen throughout the day, which can make scheduling difficult. Ask first if this is a good time to visit. Space in the clinic is limited to 3 students at any one time. Please make your own arrangements if you wish to complete the form during your PHC rotation.

****Surgical scrubs and ideally a lab coat are required to enter any of the surgical areas.** The CCRF building has restricted entry so you will need your proximity access card to enter. Note that there is no storage area in the clinic and CCRF building and that outside shoes cannot be worn in the prep room or surgery area so please bring a pair of indoor shoes when attending your session.

***** Hand in your signed form to the course coordinator no later than March 30th.**

Practical Laboratory Sessions

Faculty, veterinarians and technicians will be available to teach, provide feedback and to answer any questions during each laboratory session. Supervising faculty and veterinarians will assess each student's preparation, knowledge of the procedures to be performed and skills demonstrated during the exercise.

Attendance, participation & demonstration of appropriate preparation for laboratories will contribute to 12% (2 marks per lab) of the final course grade.

Laboratory 1: Asepsis 1 (2hr) *Review the relevant videos prior to this lab session.

This mandatory two-hour session will allow students to experience and practice the steps involved in aseptic surgeon preparation: specifically how to open a gown pack and a pack of gloves sterilely, how to perform hand scrubbing, gowning and closed gloving.

Laboratory 2: Asepsis 2 (2hr) *Review the relevant videos prior to this lab session.

This mandatory two-hour session will allow students to experience and practice the steps involved in patient preparation: specifically how to perform skin preparation (using a plastic model), how to open a drape and laparotomy sheet pack sterilely, and how to perform patient draping with application of a laparotomy sheet (using a DASIE model). (towel clamps provided separately)

Laboratory 3: Asepsis + Suturing (3hr) *Review the relevant videos prior to this lab session.

This mandatory three-hour session will put all the tasks learned thus far together and will allow students to experience and practice the following: Open an instrument pack, open a gown and laparotomy sheet pack, open a suture pack, blade and glove pack. The student will perform all the steps involved in surgeon preparation (hand scrubbing, gowning and gloving), final preparation of the patient and patient draping with application of a laparotomy sheet. The student will set up an instrument table, safely install (and eventually remove) a blade on a scalpel handle, practice basic suturing skills (secure square knots in simple interrupted and continuous patterns +/- buried knot) and perform safe disposal of sharps at the end of the lab.

Laboratory 4: Bandaging (2hr) * Review the bandage videos posted on Courselink

This mandatory laboratory session will allow students to practice placing light padded bandages, splints and cast on a canine leg model. Complications associated with bandages and their prevention will be discussed in lecture.

Laboratory 5: Surgical Oncology (biopsy and mass removal) (2hr)

This mandatory 2-hour session will allow students to learn and practice basic surgical oncology principles and techniques. During the lab, the student will practice identifying skin tension lines and the appropriate direction of closure of skin wounds, discuss and identify fascial planes in various locations and practice incisional and excisional biopsy techniques.

Laboratory 6: DASIE Ovariohysterectomy (4hr) + Model making pre-lab (1hr)

This mandatory four-hour session will allow students to perform all the tasks they have learned thus far (see laboratory 3) and in addition will allow students to experience and practice the steps involved in performing a modified 3-clamp ovariohysterectomy using a string and bead model within a DASIE. Each student will attend a 1hr pre-lab session where they will make their own DASIE spay models. This session will help students

review and understand the anatomy of the genital tract and the steps involved in the procedure.

****Review of the relevant online materials (patient and surgeon preparation, including: how to open a pack (instrument, linen, suture, blade, gloves), patient skin preparation, hand scrubbing, drying of hands, gowning, gloving, performing a sterile final preparation in surgery, draping, applying a laparotomy sheet, basic instrumentation, how to set up an instrument table, how to install and remove a blade, and suturing and Surgical tips and tricks) and completion of the instrument handling / knot tying and suturing Mastery List is required prior to attending laboratory 6 (DASIE Ovariohysterectomy).***

****You must wear scrubs for all these laboratory sessions and bring your own DASIE and instruments for laboratories # 1,2,3 and 6.***

******Please attend your assigned sessions. If this is not possible, please switch with someone since there is limited space for each lab session. Make-up laboratory sessions are not possible therefore a missed laboratory will lead to losing the experience.*** The Course Coordinator will determine what remedial activity will be required of students who miss a lab and have received academic accommodation through the Associate Dean, Students. Students that miss a lab and have not been granted accommodation will receive zero for that lab session.

Evaluati

Assessment will include: a midterm (20%) and a final examination (62%).

The course coordinator will determine the format of a make-up examination for those students who miss the midterm, and have been granted academic accommodation through the Associate Dean, Students.

On-line computer quizzes must be completed according to the schedule posted on Courselink. There are 3 computer quizzes, worth in total 6% of the final mark. Each quiz must be completed on time with a minimum grade of 70% in order to obtain 2 marks towards the final grade. If a grade < 70% is obtained, the online quiz can be repeated once, for 1 mark, if a grade >70% is obtained when the quiz is repeated. Computer quizzes can be completed using the course materials or with classmates as long as everyone involved participates in the thought process.

Online quizzes will be in the form of true or false and multiple-choice questions.

Midterm and final examination will be in the form of: true or false, multiple choice, and short-written answers and will be somewhat proportional to the amount of lecture/lab time devoted to each topic. Examination questions will include reference to material covered in class, in website materials (including pictures and videoclips), during the laboratory session and in course notes.

Difficulties in understanding course material should be directed to the instructors who presented the material in question or to the course coordinator as soon as problems are recognized.

Summary of Marks for VETM*3510

Lab sessions	6x2% = 12%
Computer quizzes	3X2% = 6%
Midterm	= 20%
Final Exam	= 62%
	100%

Midterm review:

Following the mid-term examination, there will be a three-week period in which the examination can be reviewed. There will not be an opportunity to review the examination outside of this period. To arrange a time to review the examination, please contact the Administrative Assistant to the Faculty and Chair in the Department of Clinical Studies, Linda Wing (lwing.ca).

Resource

Course notes will not be printed. Please refer to Courselink for course notes and/or Powerpoint presentations. <http://www.uoguelph.ca/vetsurgery/> will be the main reference for the first 9 lectures in this course. Alternatively, Teresa Fossum's Textbook of Small Animal Surgery (Mosby, 4th edition 2013) can also be used as a written reference. Earlier editions are also acceptable to review these basic concepts.

A DASIE along with basic instrumentation (one pair of needle drivers, a thumb forceps, a mosquito hemostat and Mayo and/or suture scissors) are required to perform the independent suturing laboratory exercises during online review and for the practical laboratory sessions. [The DASIE™ model will be graciously provided by Boehringer Ingelheim \(Metacam®\).](#) Instruments (at minimum 1 Adson type thumb forceps, 1 Mayo-Hegar needle holder, 1 curved mosquito forceps, 1 Mayo scissor +/- 1 sharp-blunt suture scissor +/- Carmalt or smaller type hemostatic clamps to practice OHE) will need to be purchased by students from the provider of their choice. A complete list of recommended instruments and options for purchase will be provided to the class reps in the first week of classes.

For students who cannot afford or do not wish to purchase their own, instrument sets have been purchased through the student equipment fund (2012) and will be available for loan beginning after lecture 1. The instruments will be distributed through your course representative and must be returned in good working order to your class representative after the last laboratory session (Friday March 2, 2017).

*****When borrowing the instrument set, the student acknowledges that he or she will owe \$35 (for replacement) should the instruments be lost, broken or fail to be returned as a complete set.*****

Schedule

*DEADLINES AND IMPORTANT DATES ARE IN BLUE

- Introduction to 3510** Brief introduction to the course and website and opportunity for questions – ****PLEASE READ THE COURSE OUTLINE PRIOR TO THIS SESSION****
- Lecture 1** Introduction to basic surgical instrumentation - Instructor: Brisson
- Independent time 1** Instrumentation online study assignment & **Quiz 1 (2%) will close Monday September 25, 2017 at 11:59 PM** - Instructor: Brisson
- Lecture 2** Suture material and knotting - Instructor: Brisson
- Lecture 3** Suture patterns and suturing technique - Instructor: Brisson
- Independent times 2-4** Suture materials, suture patterns & Tips and tricks on suturing online study assignment & online **Quiz 2 (2%) will close Monday September 25, 2017 at 11:59 PM** - Instructor: Brisson
- Lectures 4 & 5** Surgical asepsis I & II - Instructor: Brisson
- Independent times 5-8** Principles of asepsis online study assignment and quiz 3 (2%). **Quiz 3 will close Thursday October 4, 2017 at 11:59 PM** - Instructor: Brisson
- Lectures 6 & 7** Principles of abdominal surgery I & II How to open and close the abdominal cavity – Instructor: Brisson
- Independent time 9-10** Online review of surgical approach to the abdominal cavity (how to open, how to close), exploratory laparotomy and basic organ biopsies - Instructor: Brisson
- Lecture 8** The exploratory laparotomy – Instructor: Brisson
- Lecture 9** Basic organ biopsy techniques – Instructor: Brisson

Lecture 10 Complications of abdominal surgery – Instructor: Brisson

*** MIDTERM EXAMINATION (will cover lectures 1-9 + associated materials)

Lecture 11 Bandaging – A review – Instructor: tba

Independent time 11 Online review (Courselink) of bandaging videos in preparation for this lab session – Instructor: Brisson

Lectures 12 & 13 Principles of surgical oncology I & II – Instructor: Oblak

Independent time 12 Online review of suturing tips and tricks and suture patterns + independent suture practice in preparation for the oncology laboratory – Instructor: Brisson

Lecture 14 Feline and canine ovariohysterectomy – Instructor: Brisson

Independent time 13-14 Online review of ligature placement and ovariohysterectomy videos in preparation for DASIE spay laboratory. Also review opening and closing the abdominal cavity – Instructor: Brisson

Lecture 15 Use of antibiotics in surgical patients – Instructor: Singh

Lecture 16 Feline and canine castration – Instructor: Brisson

Lectures 17 & 18 Introduction to fracture fixation and coaptation I & II - Instructor: tba

**FINAL EXAMINATION

LEARNING OBJECTIVES:

Units of

Unit: Surgical instrumentation, suture materials and patterns

The student will be able to:

1. **Surgical instruments:**
 - Identify various components of surgical instruments.
 - Identify commonly used instruments (components of a basic surgical kit).
 - Understand the correct and incorrect handling of commonly used surgical instruments.
 - Discuss the use of and indication for commonly used surgical instruments.

2. **Suture materials:**
 - Name the most common absorbable and non-absorbable suture materials.
 - Compare the advantages and limitations of absorbable and non-absorbable suture materials.
 - Compare the advantages and limitations of monofilament and braided suture materials.
 - List the indications and contraindications of various suture materials.
 - Identify and list various needle types.
 - Discuss the qualities, indications and contraindications for various needle types.
 - Describe how to handle suture as it comes out of a suture pack.
 - Discuss the use of surgical staples and surgical adhesives.

3. **Suture patterns:**
 - Describe the most common suture patterns.
 - Understand the principle of and how to achieve a square knot.
 - Understand the concept of a 'slip' and 'granny' knot.
 - Understand the principles of how to place a simple interrupted and continuous suture pattern.
 - Compare the advantages and limitations of continuous and interrupted suture patterns.
 - List the indications and contraindications for the common suture patterns.

Unit: Asepsis

The student will be able to:

1. **Preparation of the surgical patient**
 - List and describe the steps involved in patient preparation for a surgical procedure.
 - List and describe the indications and contraindications for different hair removal techniques.
 - List disinfectants that are commonly used for patient skin preparation (iodine, alcohol, chlorhexidine).
 - Compare the characteristics of disinfectants that are commonly used for patient skin preparation.
 - Describe surgical site scrub techniques.
 - Describe surgical draping procedures.

2. **Preparation of the surgical team:**
 - List and describe the steps involved in surgeon hand preparation.
 - List disinfectants that are commonly used for skin preparation.
 - Compare the characteristics of commonly used disinfectants (iodine, alcohol, chlorhexidine)
 - Compare characteristics of paper and cloth drapes and gowns.
 - List the indications for proper surgical attire (hat, mask, gown and gloves).
 - Recognize sterile and unsterile portions of a surgical gown.
 - Describe surgical draping techniques.
 - Describe strike through.

3. **Sterilization techniques:**

- List and describe the various sterilization procedures used on surgical equipment.
- Describe the indications, qualities and limitations of each method of sterilization.
- List methods used to confirm the sterility of instruments or surgical packs.
- Describe the use and limitations of various sterilization indicators.

Unit: Principles of Abdominal Surgery

The student will be able to:

- Describe common surgical approaches to the abdominal cavity.
- Identify the advantages and limitations of common surgical approaches to the abdominal cavity.
- Identify and list the indications of common surgical approaches to the abdominal cavity.
- List the principles of abdominal incision and closure techniques.
- Describe potential postoperative complications associated with abdominal closure and healing and how to handle those clinically.
- Describe the steps of a complete exploratory laparotomy.
- Describe the general principles of various abdominal organ biopsy techniques.

Unit: Bandaging

The student will be able to:

- Name and describe the function of the different layers of a bandage.
- Describe the principles of application of the different layers of a bandage.
- Describe the potential complications associated with bandages.
- Describe the pathophysiology and the treatment of these complications.

Unit: Principles of Surgical Oncology

The student will be able to:

- Describe common surgical principles that apply to oncologic surgery.
- Identify the role of surgery in the diagnosis, palliation and cure of cancer.
- List the indications for surgical intervention in a cancer patient.
- List the contraindications for surgical intervention in a cancer patient.
- List the causes of treatment failure and contraindications for surgical intervention in a cancer patient.
- Describe the principles of incisional and excisional biopsy.

Unit: Ovariohysterectomy

The student will be able to:

- Describe the indications, advantages and potential disadvantages to performing OHE.
- Describe the surgical preparation required for ovariohysterectomy in dogs and cats.
- Describe the surgical approach for ovariohysterectomy (OHE).
- Describe 3 methods available to identify the genital tract during OHE.
- Understand and describe how to use of a spay hook to retrieve the genital tract.
- Understand and describe the steps to involved in performing an ovariohysterectomy
 - o Using a modified 3-clamp technique
 - o Using a 3-clamp technique
 - o Options to safely ligate the ovarian pedicles and uterine body.
 - o Options to address the broad ligament.
- Describe potential intraoperative complications associated with OHE.
- Describe how to identify and retrieve a bleeding pedicle.
- Describe potential postoperative complications associated with OHE.
- Describe technical considerations associated with performing an OHE in an animal that is in heat or pregnant or has pyometra.

Unit: Canine and feline castration

The student will be able to:

- Describe the indications, advantages and potential disadvantages to performing castration.
- Describe the surgical preparation required for castration in dogs and cats.
- Describe the surgical approach for feline and canine castration.
- Describe the difference between open and closed castration techniques.
- Understand and describe the steps involved in performing a feline and canine castration.
- Understand and describe the differences in techniques used to perform canine and feline castration.
- Describe the two techniques for feline castration (figure of 8 vs knots).
- Describe the possible intraoperative complications associated with feline and canine castration.
- Describe the possible postoperative complications associated with feline and canine castration.

Unit: Prophylactic antibiotics in surgery

The student will be able to:

1. Classification of surgical wounds
 - Describe the various types of wounds and identify which wounds would benefit from antibiotic treatment.
 - Identify a specific type of wound based on a given case scenario.
2. Factors that influence the postoperative infection rate
 - List the factors associated with surgical procedures that influence the development of postoperative infections.
3. Bacteria normally encountered in surgical patients
 - Name bacteria commonly encountered in various tissues.
 - Name an effective preventative antibiotic based on a given case scenario.
4. Institution and duration of antibiotic prophylaxis
 - Identify the most efficacious time to start prophylactic antibiotic therapy based on a given case scenario.
 - Determine an adequate duration of treatment based on a given case scenario.
5. Complications of antibiotic prophylaxis.
 - Discuss the complications associated with indiscriminate antibiotic use, including shedding of resistant organisms and superinfection.

Unit: Introduction to fracture fixation and coaptation

The student will be able to:

1. Fracture healing
 - Describe the blood supply to bone in the normal, fractured and healing states.
 - Describe the effect of blood supply variations on fracture healing.
 - Recognize and describe the three forms of bone healing and the conditions leading to each one.
 - Describe the concept of strain and apply this concept to secondary bone healing.
 - Identify and describe complications of bone healing.
 - Formulate guidelines for the correction of the principle conditions delaying bone healing.
2. Fracture repair

- Name the different forces acting on the bone.
- Discuss the importance of these forces when repairing a fracture.
- Discuss the relative strengths and weaknesses of each type of implant with respect to these forces.
- Describe the principles, indications, contraindications and risks associated with external coaptation.
- Describe the principles, indications, and contraindications of external fixation.
- Describe the biomechanical principles that make an external fixator effective.
- Discuss the principles, indications, contraindications and the risks associated with the use of intramedullary pins, cerclage wires, interlocking nails, bone screws and bone plates.
- Name the different types of bone plates and explain their respective indications.

Unit: Independent Suture Lab (Independent learning using website materials and DASIE)

The student will be able to:

1. Basic instrument handling
 - Perform and demonstrate correct surgical instrument handling.
2. Knot tying
 - Create square knots using instrument tying techniques.
 - Place circumferential and transfixing ligatures on a pedicle.
3. Interrupted suture patterns
 - Perform and demonstrate the most common interrupted suture patterns (simple interrupted, cruciate, vertical mattress and horizontal mattress patterns) using correct surgical techniques.
4. Continuous suture patterns
 - Perform the most common continuous suture patterns (simple continuous, Lembert, Cushing, and Ford interlocking patterns) using correct surgical techniques.
5. Suture materials
 - Identify common suture materials.
 - Describe the advantages and limitations of common suture materials.

Unit: Practical Laboratory Sessions

Laboratory 1

The student will be able to:

- Correctly open a gown pack and a glove pack using aseptic technique.
- Perform hand preparation using correct technique.
- Perform correct hand drying and gowning using sterile technique.
- Perform closed gloving using sterile technique.

Laboratory 2

The student will be able to:

- Perform patient preparation using a model.
- Correctly open a drape and laparotomy sheet pack.
- Perform open gloving (wearing a gown).
- Perform draping of a DASIE model using correct, sterile technique.
- Apply a laparotomy sheet using sterile technique.

Laboratory 3

The student will be able to:

- Perform patient preparation using a model.
- Correctly open a gown pack and a glove pack using aseptic technique.
- Correctly open a drape and laparotomy sheet pack using aseptic technique.
- Correctly open an instrument pack using aseptic technique.
- Perform hand preparation using correct technique.
- Perform correct hand drying and gowning using sterile technique.
- Perform closed gloving using sterile technique.
- Perform draping of a DASIE model using correct, sterile technique.
- Apply a laparotomy sheet using sterile technique.
- Perform a surgical incision using a scalpel blade.
- Demonstrate the correct placement of square knots.
- Demonstrate the placement of simple interrupted and continuous suture patterns using correct instrument handling and surgical technique.

Laboratory 4

The student will be able to:

- Correctly place an effective soft padded bandage on a limb model.
- Correctly place an effective Robert-Jones bandage on a limb model.
- Correctly create and integrate a fiberglass splint into a soft padded bandage using a limb model.
- Correctly apply and safely remove a fiberglass cast from a limb model.

Laboratory 5

The student will be able to:

- Identify skin tension lines and appropriate direction of skin closure after mass removal.
- Understand the concept of lateral margin measurement.
- Understand the concept of and how to identify deep fascial planes.
- Perform incisional and excisional biopsies using a punch biopsy instrument and a scalpel blade.

Laboratory 6

The student will be able to:

- Complete all the tasks from laboratory 3 (except patient preparation).
- Correctly approach the abdominal cavity of a DASIE model for ovariohysterectomy.
- Perform an ovariohysterectomy on a DASIE model using a modified 3-clamp technique.
- Correctly perform a 3-layer abdominal wall closure.