### Explanation of Course Numbers
- Courses in the 1000s are primarily introductory undergraduate courses.
- Those in the 2000s to 4000s are upper-division undergraduate courses that also may be taken for graduate credit with permission and additional work assigned.
- Those in the 6000s and 8000s are for master's, doctoral, and professional-level students.
- The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office.

### CERT 3004. Endocrinology for Health Sciences. 3 Credits.
How hormones control the flow of information between different cells and tissues with an emphasis on the human reproductive system; classes of hormones, sources and synthesis of hormones, receptors and target tissues, mechanisms of action and regulation, and methods used in endocrinology. Prerequisites: BISC 1111.

### CERT 3005. Topics in Biomedical Science. 1 Credit.
Topics vary by semester. May be repeated for credit provided topic differs. See Schedule of Classes for more details. Prerequisites: BISC 1111 or BISC 1112.

### CERT 4010. Clinical Human Embryology. 3 Credits.
Physiology of the female reproductive system; gamete biology, fertilization and early embryo development; embryo culture techniques, intracytoplasmic sperm injection (ICSI), and embryo selection and transfer. Proctor fee. Prerequisites: BISC 1111.

### CERT 4011. Human Embryology Laboratory. 1 Credit.
Techniques used in the clinical embryology laboratory, including embryo culture, oocyte retrievals, selection and egg denudation, sperm preparations for in vitro fertilization (IVF), and intracytoplasmic sperm injection (ICSI) procedures. CERT 4010 may be taken as a corequisite. Laboratory fee. Prerequisites: CERT 4010.

### CERT 4012. Clinical Human Andrology. 3 Credits.
The physiology of the male reproductive system; sperm anatomy and motility, seminal plasma, and male gamete biology. Proctor fee. Prerequisites: BISC 1111.

### CERT 4013. Human Andrology Laboratory. 1 Credit.
Techniques used to analyze semen for assisted reproduction procedure; sperm morphology, motility and vitality, sperm preparation, and chromatin assessment. CERT 4012 may be taken as a corequisite. Laboratory fee. Prerequisites: CERT 4012.

### CERT 4014. Human Reproductive Cryobiology. 3 Credits.
Theory and methods used to freeze sperm, testicular tissues and embryos for use during in vitro fertilization procedures. Cryo-injuries and vitrification solutions. Proctor fee. Prerequisites: BISC 1111.

### CERT 4015. Human Cryobiology Laboratory. 1 Credit.
Freezing techniques for assisted reproductive technologies; sperm and embryo freezing, embryo stage vitrification, blastocyst slow freezing, and testicular sperm freezing. CERT 4014 may be taken as a corequisite. Laboratory fee. Prerequisites: CERT 4014.

### CERT 4016. Preimplantation Genetic Diagnosis Laboratory. 1 Credit.
The role of preimplantation genetics procedures for use in reproductive medicine; embryo biopsies at different developmental stages and trophectoderm cell biopsy at the blastocyst stage. MLS 4171 may be taken as a corequisite. Laboratory fee. Prerequisites: MLS 4171.

### CERT 4017. Clinical Experience in Embryology. 3 Credits.
Application of embryology techniques in a clinical assisted reproductive technology (ART) laboratory facility. Proctor fee. Prerequisites: MLS 4010 and MLS 4011.

### CERT 4018. Clinical Experience in Andrology. 3 Credits.
Application of andrology techniques in a clinical assisted reproductive technology (ART) laboratory facility. Proctor fee. Prerequisites: MLS 4012 and MLS 4013.

### CERT 4019. Clinical Experience in Cryobiology. 3 Credits.
Application of cryobiology techniques in a clinical assisted reproductive technology (ART) laboratory facility. Proctor fee. Prerequisites: MLS 4014 and MLS 4015.

### CERT 4020. Clinical Experience in Preimplantation Genetic Diagnosis. 3 Credits.
Application of preimplantation genetic diagnosis techniques in a clinical assisted reproductive technology (ART) laboratory facility. Proctor fee. Prerequisites: MLS 4016 and MLS 4017.