ANIMAL REPRODUCTION, GYNAECOLOGY & OBSTETRICS  
Course Structure - at a Glance

<table>
<thead>
<tr>
<th>CODE</th>
<th>COURSE TITLE</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOG 601</td>
<td>GENERAL GYNAECOLOGY</td>
<td>3+1</td>
</tr>
<tr>
<td>VOG 602</td>
<td>FEMALE INFERTILITY</td>
<td>3+1</td>
</tr>
<tr>
<td>VOG 603</td>
<td>VETERINARY OBSTETRICS</td>
<td>2+2</td>
</tr>
<tr>
<td>VOG 604</td>
<td>ANDROLOGY &amp; MALE INFERTILITY</td>
<td>3+1</td>
</tr>
<tr>
<td>VOG 605</td>
<td>SEMEN PRESERVATION AND ARTIFICIAL INSEMINATION</td>
<td>2+1</td>
</tr>
<tr>
<td>VOG 606</td>
<td>REPRODUCTIVE BIOTECHNOLOGY</td>
<td>2+1</td>
</tr>
<tr>
<td>VOG 607</td>
<td>CLINICAL PRACTICE I</td>
<td>0+3</td>
</tr>
<tr>
<td>VOG 608</td>
<td>CLINICAL PRACTICE II</td>
<td>0+3</td>
</tr>
<tr>
<td>VOG 609</td>
<td>MASTER'S SEMINAR</td>
<td>1+0</td>
</tr>
<tr>
<td>VOG 701</td>
<td>ADVANCES IN GYNAECOLOGY</td>
<td>2+1</td>
</tr>
<tr>
<td>VOG 702</td>
<td>ADVANCES IN OBSTETRICS</td>
<td>2+1</td>
</tr>
<tr>
<td>VOG 703</td>
<td>ADVANCES IN ANDROLOGY</td>
<td>2+1</td>
</tr>
<tr>
<td>VOG 704</td>
<td>ADVANCES IN REPRODUCTIVE BIOTECHNOLOGY</td>
<td>1+1</td>
</tr>
<tr>
<td>VOG 705</td>
<td>ADVANCES IN SEMEN PRESERVATION</td>
<td>1+1</td>
</tr>
<tr>
<td>VOG 706</td>
<td>CLINICAL PRACTICE I</td>
<td>0+3</td>
</tr>
<tr>
<td>VOG 707</td>
<td>CLINICAL PRACTICE II</td>
<td>0+3</td>
</tr>
<tr>
<td>VOG 790</td>
<td>SPECIAL PROBLEM</td>
<td>0+2</td>
</tr>
<tr>
<td>VOG 791</td>
<td>DOCTORAL SEMINAR I</td>
<td>1+0</td>
</tr>
<tr>
<td>VOG 792</td>
<td>DOCTORAL SEMINAR II</td>
<td>1+0</td>
</tr>
<tr>
<td>VOG 799</td>
<td>DOCTORAL RESEARCH</td>
<td>45</td>
</tr>
</tbody>
</table>

ANIMAL REPRODUCTION, GYNAECOLOGY & OBSTETRICS  
Course Contents

VOG 601: GENERAL GYNAECOLOGY  
3+1

Objective: To understand hormonal regulation of female reproduction and therapeutic management of infertility.

Theory

UNIT I
Puberty and sexual maturity, role of hypothalamic-pituitary-gonadal axis in attainment of puberty and sexual maturity, onset of postpartum ovarian activity, Endocrine regulation of estrous cycle.

UNIT II
Folliculogenesis, oogenesis and ovulation and associated endocrine pattern, manipulation of follicular waves, synchronization of estrus and ovulation and induction of ovarian activity.

UNIT III
Gamete transport, fertilization, implantation and maternal recognition of pregnancy.

UNIT IV
Embryonic and fetal development, placentation, fetal circulation and gestation, position of fetus in the uterus, age characteristics of fetus.

UNIT V

UNIT VI
Factors affecting reproduction - seasonality, nutrition, stress, environment, management, suckling and diseases.

UNIT VII
Lactation and artificial induction of lactation.

Practical

Suggested Readings


VOG 602: FEMALE INFERTILITY  
3+1

Objective: To impart knowledge and training in diagnosis and treatment of infertility in female domestic animals.

Theory

UNIT I
Introduction to infertility, classification, economic impact. Anatomical causes of infertility, congenital and hereditary causes and acquired defects.
UNIT II
Nutritional causes of infertility. Importance of body condition score.

UNIT III
Managemental and environmental causes of infertility. Out of season breeding.

UNIT IV
Infectious causes of female infertility, specific and non-specific infections.

UNIT V
Ovarian dysfunction: anoestrus, cystic ovarian degeneration, anovulation, delayed ovulation and luteal insufficiency.

UNIT VI
Repeat breeding: its causes, diagnosis and treatment.

UNIT VII
Early embryonic death (EED): causes, diagnosis and therapeudic management.

UNIT VIII
Abortion: infectious and non-infectious causes, diagnosis and prevention of abortion.

UNIT IX
Interactions in Immunological mechanisms and infertility.

Practical

Suggested Readings

VOG 603: VETERINARY OBSTETRICS

Objective: To impart knowledge and training on problems of pregnancy and parturition and their management in domestic animals.

Theory

UNIT I
Parturition: stages of parturition, mechanism of initiation of parturition, hormonal profiles associated with parturition.

UNIT II
Principles of handling of dystocia, obstetrical procedures: mutations, fetotomy, caesarean section. Obstetrical anesthesia and analgesia, epidural anesthesia.

UNIT III
Fetal and maternal dystocia: causes, diagnosis and management.

UNIT IV
Uterine torsion: causes, diagnosis and its correction.

UNIT V
Diseases and accidents during gestation and around parturition.

UNIT VI
Etiology, diagnosis and treatment of ante-partum and post-partum uterine and vaginal prolapse.

UNIT VII
Induction of parturition and elective termination of pregnancy.

UNIT VIII
Involution of uterus following normal and abnormal parturition.

UNIT IX
Care of dam and the newborn.

Practical

Suggested Readings
VOG 604: ANDROLOGY AND MALE INFERTILITY

Objective: To impart knowledge and training about male reproduction and treatment of male infertility in domestic animals.

Theory

UNIT I
Structure and function of reproductive tract of male.

UNIT II
Sexual behavior and examination of bulls for breeding soundness.

UNIT III
Spermatogenesis, (formation, migration, maturation and ejaculation of semen), fine structure of spermatozoa, semen and its composition. Diseases transmitted through semen.

UNIT IV
Factors affecting semen quality, semen culture, tests for assessment of sperm motility, sperm survival and fertilizing capacity of spermatozoa.

UNIT VI
Causese of infertility: hereditary, congenital, infectious, nutritional and hormonal. Pathological and functional disturbances of epididymis, vas deferens and accessory sex glands.

UNIT VII
Impotencia cocundi and impotentia generandi. Testicular hypoplasia and degeneration: causes and affect on semen and fertility.

UNIT VIII
Coital injuries and vices of male animals.

Practical

Suggested Readings

VOG 605: SEMEN PRESERVATION AND ARTIFICIAL INSEMINATION

Objective: To impart knowledge and training about collection, evaluation and preservation of semen and artificial insemination (AI) in domestic animals.

Theory

UNIT I
History of artificial insemination.

UNIT II
Methods of semen collection.

UNIT III
Semen evaluation: macroscopic, microscopic, biochemical and microbiological tests, Computer assisted semen analysis (CASA).

UNIT IV
Semen preservation. Extenders for preservation of semen at different temperatures. Semen additives for enhancement of motility and fertilizing capacity of spermatozoa.

UNIT V
Cryopreservation of semen. Effects of cryopreservation on spermatozoa, semen quality and fertility.

UNIT V
Thawing protocols of frozen semen. Factors affecting post-thaw semen quality.

UNIT VII
Ideal protocol for AI in different species of animals. Factors affecting success of AI.
Practical

Suggested Readings

VOG 606: REPRODUCTIVE BIOTECHNOLOGY 2+1

Objective: To impart knowledge and training on biotechniques in animal reproduction.

Theory
UNIT I
Embryo transfer technology: selection of donors and recipients.

UNIT II
Synchronization, super-ovulation, surgical and non-surgical collection of embryos and evaluation of embryos.

UNIT III
Cryopreservation of embryos, transfer of embryos to donors.

UNIT IV
In vitro fertilization, in vitro maturation, micromanipulation of embryos.

UNIT V
Sexing of sperm and embryos.

UNIT VI
Transgenic animals. Chimeras.

UNIT VII
Stem cell biotechnology

UNIT VIII
Immuno-neutralization of hormones. Immunomodulation of fertility.

Practical

Suggested Readings
Gordon I. 2004. Reproductive Technologies in Farm Animals. CABI.

VOG 607: CLINICAL PRACTICE – I 0+3

Objective: Hands-on training on diagnosis and treatment of reproductive disorders in animals in TVCSC.

Practical
Clinical examination of animals affected with reproductive disorders, use of diagnostic techniques for diagnosis and institution of required therapy. Maintenance of case records. Presentation on selected/assigned cases.

Suggested Readings

VOG 608: CLINICAL PRACTICE – II 0+3

Objective: Hands-on training on diagnosis and treatment of reproductive disorders in animals in TVCSC.

Practical
Clinical examination of animals affected with reproductive disorders, use of diagnostic techniques for diagnosis and institution of required therapy. Maintenance of case records. Presentation on selected/assigned cases.

Suggested Readings
VOG 701: ADVANCES IN GYNAECOLOGY 2+1

Objective: To learn about advances in endocrine, ovarian and uterine functions and effect of nutrition, season and immunological factors on female fertility.

Theory
UNIT I
Neuro-endocrine control of reproduction, follicular development, ovulation fertilization and implantation. Embryonic and fetal development.

UNIT II

UNIT III
Embryonic losses, abortion and their prevention.

UNIT IV
Seasonal breeders, synchronization and induction of estrus and ovulation in seasonal breeders, Assisted reproductive technology (ART) to increase reproductive efficiency in farm animals.

UNIT V
Effect of stress, nutrition and immunological factors on fertility.

UNIT VI
Onset of postpartum ovarian activity and factors affecting it.

UNIT VI
Diagnostic & therapeutic approaches in infertility: Principles of hormone therapy in reproductive disorders, Laproscopy, ultrasonographic diagnosis of ovarian/uterine dysfunction, RIA/ELISA techniques for hormones assay in reproductive disorders, vaginal and uterine cytology

Practical
Clinical examination of female animals. Use of ultrasonography in ovarian function (follicular image pattern, follicular dynamics) and in early pregnancy diagnosis and infertility. Utility of uterine culture, uterine cytology and uterine biopsy (histopathological examination) in infertility investigation. Laparoscopy in diagnosis of ovarian and uterine dysfunction. ELISA/RIA of hormones and interpretation of results. Use of Assisted reproductive technology (ART) to enhance reproductive efficiency in farm animals.

Suggested Readings
Selected articles from journals.

VOG 702: ADVANCES IN OBSTETRICS 2+1

Objective: To learn current developments in diagnosis and management of dystocia, accidents of gestation and peri-parturient disorders in domestic animals.

Theory
UNIT I
Conceptus and its development. Factors influencing gestation period and birth weight.

UNIT II
Anomalies of conceptus, teratogens and effect of stress on conceptus development.

UNIT III
Mechanism of initiation of parturition. Use of tocolytic drugs in management of uterine inertia.

UNIT IV
Induction of parturition and termination of abnormal pregnancies. Obstetrical analgesia and anaesthesia.

UNIT V
Pre-treatment evaluation of the dam suffering from dystocia. Management of maternal and fetal dystocia, hydramnion, fetal mummification, fetal maceration, uterine inertia and uterine torsion.

UNIT VI
Fetotomy, caesarean section and ovario-hysterectomy.

UNIT VII
Neo-natal physiology and post-natal adaptations.

UNIT VIII
Involution of uterus, post-partum ovarian dysfunction and their manipulation.

Practical
Obstetrical operations in fetal dystocia: Mutations, fetotomy, caesarean section, ovario-hysterectomy; induction of parturition, use of tocolytic drugs in dystocia, obstetrical analgesia and anaesthesia.

Suggested Readings
Selected articles from journals.
Objective: To learn advances in male reproduction and treatment of male infertility in domestic animals

Theory

UNIT I
Spermatogenesis, spermatogenic waves, sperm passage in male genitalia, biochemical milieu of male genitalia. Correlation between motility and fertilizing capacity of spermatozoa.

UNIT II
Separation of motile and immotile spermatozoa. Sexing and separation of male and female determining spermatozoa.

UNIT III
Sperm plasma membrane and its permeability and binding properties: acrosome and lysosomal enzymes, sperm nucleus and nuclear proteins. Mitochondria and their role in sperm metabolism. Flagellum and the mechanochemical basis of motility and cyclic nucleotides.

UNIT IV

UNIT V
Fructolysis index. Aerobic and anaerobic metabolism of spermatozoa.

UNIT VI
Biochemical markers of fertility in males, sperm chromatin structure assay, Anti-sperm antibodies.

Practical
Breeding soundness evaluation of bulls, biochemical tests of semen for evaluation of fertility, semen culture for diagnosis of venereal diseases, diagnosis and treatment of genital pathological condition. Computer assisted semen analysis (CASA), Semen evaluation for assessment of fertilizing capacity of spermatozoa: cervical mucus penetration test, sperm capacitation test, hypo osmotic swelling test and zona free hamster egg penetration test. Anti-sperm antibody assay.

Suggested Readings
Selected articles from journals.

VOG 704: ADVANCES IN REPRODUCTIVE BIOTECHNOLOGY

Objective: To learn advances in recent developments in biotechnology in reproduction for the production of desired elite animals.

Theory

UNIT I
Embryo transfer technology and its application in farm animals.

UNIT II
Selection and management of donor and recipient animals. Superovulation, surgical and non-surgical collection, evaluation of embryos and transfer of embryos.

UNIT III
In vitro fertilization and maturation of oocytes.

UNIT IV
Micromanipulation, sexing and cryopreservation of embryos.

UNIT V
Sexing of sperm and embryos.

UNIT VI
Transgenic animals. Chimeras.

UNIT VII
Stem cell biotechnology

UNIT VIII
Immuno-neutralization of hormones. Immunomodulation of fertility.

Practical

Suggested Readings
Selected articles from journals.
VOG 705: ADVANCES IN SEMEN PRESERVATION  

Objective: To learn advances in processing and cryopreservation of semen and insemination techniques to obtain high fertility.

Theory

UNIT I
Transmission of venereal diseases through semen and their prevention.

UNIT II
Factors affecting motility and fertilizing capacity of spermatozoa. semen collection, extension and cryopreservation of semen, damages to spermatozoa caused by cryopreservation.

UNIT III
Use of semen additives for promotion of sperm motility and fertilizing capacity.

UNIT IV
Thawing protocols for frozen semen. Post-thaw evaluation of motility and fertilizing capacity of spermatozoa.

Practical

Suggested Readings
Selected articles from journals.

VOG 706: CLINICAL PRACTICE – I  

Objective: Hands-on training on diagnosis and treatment of reproductive disorders in animals.

Practical
Clinical examination of animals affected with reproductive disorders, use of diagnostic techniques for diagnosis and institution of required therapy, maintenance of case records, presentation on selected/assigned cases.

Suggested Readings
Selected articles from journals.

VOG 707: CLINICAL PRACTICE – II

Objective: Hands-on training on diagnosis and treatment of reproductive disorders in animals

Practical
Clinical examination of animals affected with reproductive disorders, use of diagnostic techniques for diagnosis and institution of required therapy.

Suggested Readings
Selected articles from journals.

VOG 790: SPECIAL PROBLEM

Objective: To expose students to research techniques related to sub discipline of the subject and submission of written project with references.

Practical
Student will carry out research on allotted project and submit the project along with research papers for publication in scientific journals.

ANIMAL REPRODUCTION, GYNAECOLOGY & OBSTETRICS

List of Journals

- American Journal of Obstetrics and Gynecology
- Animal Reproduction
- Animal Reproduction Science
- Animal Science Journal
- Bibliography of Reproduction
- Biology of Reproduction
- Equine Practice
- Equine Veterinary Journal
- Fertility and Sterility
- Indian Journal of Animal Reproduction
- Indian Journal of Animal Sciences
- Indian Journal of Experimental Biology
- Indian Veterinary Journal
- Journal of American Veterinary Medical Association
- Journal of Animal Science
- Journal of Dairy Science
- Journal of Endocrinology
Suggested Broad Topics for Master’s and Doctoral Research

- Anoestrus: Endocrinological investigations
- Reproductive biotechnology
- Investigations into andrological problems
- Management of obstetrical problems