Master of Veterinary Epidemiology and Economics

Department of Veterinary Epidemiology and Public Health

Course syllabus for Advanced Veterinary Epidemiology

o **Module Code:** VEPH-721
o **Credit hours: 3**

Module title	Advanced Veterinary Epidemiology
Module code	VEPH-721
ECTS	5
Module type	Compulsory
Prerequisite module code	VEPH-711
Co-prerequisite module code	None
Barred combination	None
Description of module	Animal health problems are best addressed within the framework of the dynamics of health/illness in populations than individual animals by shifting to herd health programs and applying preventive measures. The course will help to understand disease dynamics in populations of animals to apply preventive and control actions effectively and predict theoretically and mathematically future disease situations in a particular environmental setting. The course deals with epidemiological and experimental studies; animal health information system; interpretation of diagnostic tests' results; Bias and confounding and standardization of rates; Survival analysis; Decision analysis; Modeling and simulation.
Learning outcomes	On successful completion of this course students would be able to: • Design observational analytic studies and field trials • Determine and evaluate diagnostic properties of laboratory tests • Construct models of animal diseases

	• Collect, store, retrieve, analyze and interpret epidemiological data using relevant softwares
	• Plan and manage disease control projects
Content	• *Epidemiological studies and experimental trials,* The course contains observational studies including case control, cross-sectional, and prospective studies and hybrid study designs. Measures of association including odds ratio, and relative risk are discussed. The unit also addresses how intervention trials (field and clinical trials) are executed. Include design, conduct and analysis of trials.
	• *Introduction to clustered epidemiologic data:* include assumptions of independence; types of clustered (dependence) data; overview of methods to deal with clustering for continuous and categorical outcomes data.
	• *Animal health information system:* This course unit contains topics of the nature of epidemiological data, methods of collection of information, questionnaire administration, participatory epidemiology, disease monitoring and surveillance.
	• *Design and evaluation of animal health surveillance and control programs* involving multiple herds; Farm-level animal disease and production surveillance
	• *Application of quantitative diagnostic tests to populations:* The unit deals with review of sensitivity, specificity, predictive values (both positive and negative) and multiple testing including serial, parallel testing and retesting of negative herds. Statistical handling of multiple testing is addressed. Agreement between tests using the *k (kappa)* statistic is included under this unit. Evaluation of test properties is discussed both at the individual level and the herd (herd level testing).
	• *Bias and confounding and standardization of rates:* The sources and classification of bias are addressed. Conceptualization of

	confounding bias is discussed in detail. Methods of control of bias will be looked objectively. Standardization of epidemiological rates is included under this unit. • *Survival analysis:* In this are dealt follow-up-life tables, Kaplan-Meier survival analysis, and Cox proportional hazard model. • *Decision analysis:* The unit consists of decision model, decision analysis under certainty, decision analysis under uncertainty, averaging-out, folding-back processes, sensitivity analysis, and ex-post analysis
Teaching strategy	• Face-to-face class room teaching using reading/handout, PowerPoint presentation, lectures by experts, tutorial, web-based teaching, practice sessions in labs • Self-leaning: reading books, Journals and web-based information further and literature searching (review), • Collaborative: presentation of research findings, group work and discussion, field trip and visit to different laboratories, parks, ranches and field and student presentations/case studies
Assessment criteria and evaluation	Students' assessment is continuous and they are expected to learn through: • Submit assignments (individual), reports, case studies, reviews • Submit group assignments • Should attend classes • Take final exam and other tests
Assessment strategy	• Written examination • Graded - Case study, problem solving exercises, literature search (review), field visit reports • Graded - Group work and class presentation • *Module assessment*: Each student will give his /her module assessment report to the instructors in writing as feedback for the improvement of the module and delivery mechanisms.

Role of instructors and students	• Instructors
	   o Prepared and ready to transmit, engage, practice, and apply knowledge and skills of the module by way of lecture, tutorial, demonstration, etc. to the students
	   o Use all teaching aids as needed
	   o Demonstrate data management and analysis
	   o Have the knowledge of research outputs done in the country in epidemiology and also have a store of data to be used for exercises
	   o Check that all computers in the lab are working, virus free, and soft wares are installed
	   o Have a knowledge of internet usage and addresses
	   o Prepare cases geared towards problem solving
	   o Select and arrange educational tours right from the beginning of the module
	   o Guide students in any time as needed
	• Students
	   o Prepared and ready to learn and keen to know more
	   o Be punctual in coming to classes and meeting deadlines of assignments
	   o Protect computers and accessories from damage and avoid disuse
	   o Develop language skill
	   o Develop computational skill
	   o Comply to all assignments forwarded from the instructor
	   o Upheld professional ethics and more in the class, in the lab and during visits (trips)

Teaching support and inputs	• Computers • Books • Chapters in books • Journals • Internet

	- Epidemiological software - Requires up to date books, journals, etc to implement the module successfully according to the current reform - Vehicle is required for field visit for the module - Linkage is required with stakeholders such as farms, ranches, parks and labs for educational visit - ICT technician is required to protect computers from viruses, to construct intranet in the faculty to upload lecture material for students and to get internet lines all the time
Module requirements	- Every student taking the module should be prepared and ready to learn and keen to know more by attending at least 80% of the time given - Be punctual in coming to classes - Work assignments individually and/or in groups and meeting deadlines of assignments - Protect computers and accessories from damage and avoid disuse - Develop language skill - Develop computational skill - Comply to all assignments forwarded from the instructor - Upheld professional ethics and more in the class, in the lab and during visits (trips) - Should pass all written examinations - Should get pass mark in all reports of assignments
Module calendar	3 weeks 40% of the module content will be covered by instructors through classroom teaching and labs 40% of the module content will be covered by students through independent study, practices, and visits 20% of the module content will be covered by group discussion

	and assignments –collaborative teaching
Reading materials	1. Catley A. (1999). Methods On The Move – A review of veterinary uses of participatory approaches and methods focusing on experiences in dryland Africa. Nairobi: PAVE Project. 2. Smith R.D. (1995). Veterinary Clinical Epidemiology – a problem oriented approach, Second Edition. Boca Raton: CRC Press. 3. Dohoo I, Martin W, Stryhn H (2004). Veterinary Epidemiologic Research. AVC Inc., Prince Edward Island, Canada. 4. Thrusfield M, (2005). Veterinary Epidemiology, 3rd edit. Blackwell publishing. 5. Salman MD, (2003). Animal Disease Surveillance and Survey Systems, Methods and Applications. Blackwell publishing. 6. Brownson R, Petitti D (1998). Applied Epidemiology, Theory to Practice. Oxford University Press, New York, Oxford. 7. Pfeiffer D (2002). Veterinary Epidemiology - An Introduction. The Royal Veterinary College, University of London.

14.2.1. Applied Economic Modelling for Veterinary Science

- **Module Code: VEPH-722**
- **Credit hour: 2**

Module title	Applied Economic Modelling for Veterinary Science
Module code	VEPH-722
ECTS	3
Module type	Compulsory
Prerequisite module code	None
Co-prerequisite module code	None
Barred combination	None
Description of module	The course provides a general frame work in economic modelling/ analysis in animal health economics. It deals how to choose appropriate modelling types and techniques based on system analysis. It deals different economics models like partial budgeting, decision analysis, cost benefit analysis and more advance techniques like linear programming, dynamic programming, Markov chain and Montecarlo simulation. It also describes the uses of social cost benefit analysis and multi criteria analysis.
Learning outcomes	The main objective of this modle is the familiarize students with basic economics methods and tools that can used in to support decisions in the field of animal health. At the end of this course students will be able to: - outline general frame work for animal health economics - list the different perspectives on economic modelling - describe and apply different economics models that are used at different levels of economic organization; farm level, sectorial level and national level - describe and used static and dynamic economic models in

	animal health issues

Content	1. Introduction to economic modelling (1hr)
	
	2. Framework animal health economics (1 hr)
	
	3. Perspectives on economics modelling (2 hrs)
	
	4. Modelling techniques (I) (8 hrs)
	
	    4.1 Partial budgeting (
	
	    4.2 Cost benefit analysis (discounting)
	
	    4.3 Decision tree analysis
	
	5. Modelling techniques (II) (6hrs)
	
	    5.1 Linear programing
	
	    5.2 Dynamic programing
	
	6. Modelling (III) (6hrs)
	
	    6.1. Monte carlo analysis
	
	    6.2. Marckovhain modelling
	
	7. Modelling (IV)(5hrs)
	
	    7.1. Farm vs society
	
	    7.2. Cost utility analysis
	
	8. Multicriteria analysis (3 hrs)

Teaching strategy	• Classroom teaching and • software application • Individual exercises • Group work
Assessment criteria	Written exam Submission of assignment
Assessment strategy	• Lecture attendance • Correction of exam papers • Evaluation of written assignment reports
Role of instructors and	• Instructors

students	• Prepared and ready to transmit, engage, practice, and apply knowledge and skills of the module by way of lecture, tutorial, demonstration, etc. to the students
	• Use all teaching aids as needed
	• Demonstrate data management and analysis
	• Check that all computers in the lab are working, virus free, and soft wares are installed
	• Have a knowledge of internet usage and addresses
	• Prepare cases geared towards problem solving
	• Guide students in any time as needed
	• Students
	  ○ Prepared and ready to learn and keen to know more
	  ○ Be punctual in coming to classes and meeting deadlines of assignments
	  ○ Protect computers and accessories from damage and avoid disuse
	  ○ Develop computational skill
	  ○ Comply to all assignments forwarded from the instructor
	  ○ Upheld professional ethics and more in the class, in the lab and during tutorials

Teaching support and inputs	• Computers • Books • Chapters in books • Journals • Internet • relevant software

Module requirements	- Prepared and ready to learn and keen to know more - Be punctual in coming to classes and meeting deadlines of assignments - Protect computers and accessories from damage and avoid disuse - Develop computational skill - Comply to all assignments forwarded from the instructor - Upheld professional ethics and more in the class, in the lab and during visits (trips) - Should pass all written examinations - Should get pass mark in all reports of assignments
Module calendar	2 Weeks
Reading materials	- Dijkhuizen , A.A. and Morris, R.S. 1997. Animal health economics: priciples and applications. Post graduate foundation in veterinary science, university of Sydeny, Sydney, Australia. - Putt, N.S.H., Shaw, A.P.m., Woods, L., James, A.D.1987. Veterinary Epidemiology and Economics in Africa. ILCA Manual No. 3. *The economics of animal disease control*, Publication of the Office international des épizooties (OIE), Scientific and Technical Review, Vol. 18 (2), August 1999.

14.2.2. International Trade and Risk Analysis

- **Module code: VEPH-723**

- **Credit hours: 3**

Module Title	International Trade and Risk Analysis
Module Code	VEPH-703
ECTS	5
Module type	Compulsory
Pre-requisite module code (s)	none
Description	The module aims to familiarize students with international (FAO, OIE, Codex, WTO) rules and regulations; standard guidelines on international trade in livestock and livestock products; Emphasis is given to international and national agreements and requirements in the international trade of animals and animal products, laws and regulations on import/export of animals and animal products, Codex Alimentarius, Sanitary and Phytosanitary (SPS), and World trade organization (WTO). The course also highlights concepts, methods and applications of risk analysis on import and export livestock products.

Learning outcomes	After successful completion of this module, the students will be able to:
	Know the requirements laid in exporting and importing livestock and livestock products
	Understand the basic national and international requirements and agreements in the trade of animals and animal products
	Know the principles, concepts and methods of risk analysis
	Conduct a general food safety or import risk analysis in a team work
	Conduct quantitative and qualitative risk analysis
	Understand the functions and roles of OIE, Codex Alimentarius, WTO, SPS in food safety and international trade of animals and animal products.
Contents	**Unit I**. International and EU animal health guidelines
	Globalization, international trade, animal health and food safety
	Introduction to international requirements, laws and regulations on import and export of animals and animal products,
	Functions and roles of the Codex Alimentarius
	The codex system: The codex alimentarius commission and how it functions
	Codex and consumers
	Codex and the internationl food trade
	The international plant protection convention (IPPC) and its role
	Roles and functions of World Trade Organization (WTO) and OIE in the internationa trade of animals, food products and food safety
	Basic principles of General Agreement on Tarrifs and Trade (GATT) and
	Unit II. The Sanitary-phyto sanitary agreement of the WTO
	Principles and applications of WTO Sanitary and phytosaniatry (SPS), agreements and requirements
	Unit III. Risk analysis
	Risk analysis: definitions, principles, applications and components
	Zero-risk versus acceptable risk

	Concept of uncertainty *Components and phases of risk analysis*: Hazard identification, Risk assessment, Risk management, Risk communication *Components of risk assessment*: release assessment, exposure assessment, consequence assessment, risk estimation *Probability distributions* *Scenario trees (risk pathways) and scenario tree analysis* *Qualitative risk assessment* *Quantitative risk assessment* *Microbial risk analysis* Risk communication
Teaching strategies (methods)	•Lectures • Individual and group reading assignments • Topics appropriate for individual and/or group project papers • Group or individual presentation and discussion on current scientific articles different aspects of the module
Assessment criteria	Students will be assessed based on: • Written examination • Evaluation of assignment papers, projects • Evaluation of visit reports • Class room presentation and discussion on review papers prepared on latest scientific articles
Respective role of instructors and students	Instructors' roles: • Conduct block teaching • Prepare and update the module, and upload on websites on time for students • Prepare and provide hand outs and power point presentations • Provide students the web addresses (if any) related to the module and web site for down loading module • Organize and provide reference lists (books as well as scientific journals) for reading, assignment preparation, project papers, etc.

	• Facilitate students' individual and group activities
	• Organize students' field work and visits
	• Prepare appropriate topics for project work presentation (s) and discussion sessions and organize the activities
	• Assess students' performances (written and oral presentations)
	• Provide timely feedback orally and in writing
	• Make follow-up on developments made
	• Plan and implement students' consultation program
	• Take attendance
	Students' roles:
	• Attend sessions
	• Active participation during visits
	• Carry out individual and group tasks
	• Present and discuss on individual and group tasks
	• Timely submission of reports of visits, assignment and project activities
	• Carry out reading assignments
Teaching support and inputs	• Hand outs, power pint presentations
	• Module on International trade in livestock and livestock products
	• Web addresses (if any) related to the module and web site for down loading module
	• Reference lists (books as well as scientific journals) for reading, assignment preparation, project papers, etc.
	• Visits to fields
	• Overhead projectors and transparencies
	• Scanners and printers, LCDs, laptops, projection screens, flip charts
	• DVD players, and video CDs/DVDs
	• Photocopier and photocopy papers
	• Stationery (flashcards, CDs/DVDs, markers, scotch tape, push pin, scissors, staples, stapler, duplication paper, ink, etc.)

Module requirement	• Every student registered for the module is required to attend the lectures for not less than 80% of the time given.
	Students should:
	• Take notes during lecturing; download module reading material and reading assignments
	• Work assigned assignments and projects individually and in groups
	• Accomplish individual or group based presentation and discussion on recent literature relevant to the module
	• Revise the hand outs, module and any further reading material at the end of the classes
	• Complete reading assignments on time
	• Submit reports of visits, assignments, and projects on time
Module calendar	3 weeks
Reading materials	1. Manuals on International rules and regulations.
	2. Current literature provided by the instructor.

14.2.3. Introduction to Molecular Epidemiology of Infectious Diseases

- **Module code: VEPH-704**
- **Credit hourse: 2**

Module Title	Introduction to Molecular Epidemiology of Infectious Diseases
Module Code	VEPH-704

ECTS	5
Module type	Compulsory
Pre-requisite module code (s)	none
Description	The course introduces applications of molecular biology techniques as a tool in the investigation of infectious diseases of humans and animals. This course will provide a comprehensive overview and detailed discussion on the core molecular approaches that are and can be used in addressing population medicine issues and application of molecular techniques in our understanding of the etiology, transmission and control of infectious diseases that are important to veterinary medicine and public health. Theoretical and practical aspects of various molecular biology methods will be discussed in the context of epidemiological studies of infectious diseases including both bacterial and viral infections, particularly of zoonotic significance. Lecture topics will cover the principles and application of various molecular techniques to problems of infectious diseases; population and evolutionary genetics of pathogenic microorganisms; data analysis and interpretation of results.
Learning outcomes	After taking this class, students are expected to be able to understand the key molecular 1approaches useful for epidemiologic investigations and will be able to integrate molecular biology approaches into epidemiological investigations. Students will learn a variety of existing and emerging molecular tools that can be applied to epidemiological studies of infectious diseases. Students will understand the advantages and limitations of each molecular technique and will be able to make a critical analysis and interpretation of data collected with various molecular approaches. Students will be able to use molecular approaches to design and implement epidemiological studies to investigate problems of infectious diseases.
Contents	Introduction and core methods

	- *Molecular Technologies:* Course Introduction: Principles, Approaches - *Core methods-* Restriction digestion - *Core methods-* Sequencing (basic concepts) - *Core methods-* PCR amplification (basic concepts) - *Core methods-* Hybridization and nucleic acid probes Molecular tools for Epidemiologic Investigation - Restriction-based genotyping (*PFGE & RFLP*) - Sequence-based genotyping (*MLST*) - Genomics and *Microarray* - Amplification-based genotyping (*RAPD*) - Gene *cloning* Emerging Technologies: *Suspension array* Emerging Technologies: *Pyrosequencing* Phylogenetic analysis Bioinformatics **Practical applications in public health (will be given by our staff members)** - Dynamics of disease transmission (Host-pathogen interaction) - *Food safety* applications (bacterial) - *Zoonotic Diseases* applications-HPAI - *Animal Health* applications-*Mycoplasma* - *Nosocomial* applications- MRSA - *Nosocomial* applications- *C. Difficile* *Global issues:* Calicivirus infections *Global issues:* Waterborne Diseases
Teaching strategies (methods)	•Lectures • Individual and group reading assignments • Topics appropriate for individual and/or group project papers • Group or individual presentation and discussion on current scientific

	articles different aspects of the module
Assessment criteria	Students will be assessed based on: • Written examination • Evaluation of assignment papers, projects • Class room presentation and discussion on review papers prepared on latest scientific articles
Respective role of instructors and students	Instructors' roles: • Conduct block teaching • Prepare and update the module, and upload on websites on time for students • Prepare and provide hand outs and power point presentations • Provide students the web addresses (if any) related to the module and web site for down loading module • Organize and provide reference lists (books as well as scientific journals) for reading, assignment preparation, project papers, etc. • Facilitate students' individual and group activities • Prepare appropriate topics for project work presentation (s) and discussion sessions and organize the activities • Assess students' performances (written and oral presentations) • Provide timely feedback orally and in writing • Make follow-up on developments made • Plan and implement students' consultation program • Take attendance Students' roles: • Attend sessions • Active participation • Carry out individual and group tasks • Present and discuss on individual and group tasks • Timely submission of reports , assignment and project activities

	• Carry out reading assignments
Teaching support and inputs	• Hand outs, power pint presentations
	• Module on International trade in livestock and livestock products
	• Web addresses (if any) related to the module and web site for down loading module
	• Reference lists (books as well as scientific journals) for reading, assignment preparation, project papers, etc.
	• Overhead projectors and transparencies
	• Scanners and printers, LCDs, laptops, projection screens, flip charts
	• DVD players, and video CDs/DVDs
	• Photocopier and photocopy papers
	• Stationery (flashcards, CDs/DVDs, markers, scotch tape, push pin, scissors, staples, stapler, duplication paper, ink, etc.)
Module requirement	• Every student registered for the module is required to attend the lectures for not less than 80% of the time given.
	Students should:
	• Take notes during lecturing; download module reading material and reading assignments
	• Work assigned assignments and projects individually and in groups
	• Accomplish individual or group based presentation and discussion on recent literature relevant to the module
	• Revise the hand outs, module and any further reading material at the end of the classes
	• Complete reading assignments on time
	• Submit reports of visits, assignments, and projects on time
Module calendar	2 weeks
Reading materials	1. Manuals on molecular techniques
	2. Current literature provided by the instructor.

14.2.4. Modelling and Dynamics of Infectious Disease

- **Module code: VEPH-725**
- **Credit hour: 2**

Module title	Modelling and dynamics of infectious disease
Module code	VEPH-725
ECTS	5
Module type	Compulsory
Prerequisite	None
Co-prerequisite module code	None
Barred combination	None
Description of module	The course starts with some historical remarks and introduces concepts of mathematical modelling though examples of vaccination and herd immunity. The course introduces SIR compartment models and their differential equations in deterministic way. It further elaborates about with other concepts related to mathematical model like basic reproduction number R_0, exponential growth rate, generation interval, final size. It also discusses the force of infection, and how the force of infection depends on contacts between individuals and population size. Then it will analyse the closed and open SIR models, without and with demography, and look at the effective reproduction ratio, peak prevalence, final size, exponential growth, and equilibrium prevalence. The course also deals with Stochastic SIR model: stochastic models will be discussed. It starts with the stochastic version of the SIR model and sees what the effect of stochasticity is on outbreak size and extinction. Second, the Reed-Frost model will be discussed

Learning outcomes	The main objective of this course is to introduce students to basic concepts of mathematical modelling of infectious disease and its application to disease epidemiology and control. At the end of this module student will be able to Describe the history of mathematical modelling and its application Understand herd immunity and basic reproductive ratio Formulate and simulate infectious disease in deterministic and stochastic models Modelling infectious diseases in homogenous and heterogonous population
Content	Historical remarks on mathematical modelling of infectious disease (2 hours) Vaccination and herd immunity (4hours) Introduction to deterministic models(8 hours) Infectious disease epidemiology Basic reproduction number R_o Compartment SIR models Differential equations of SEIR models SEIR model with demography and without demography Stochastic models I: stochastic SIR models (4hrs) final size distribution Minor outbreaks Stochiastic models II. Chain-binomial models (4 hrs) Reed-Frost model Modelling in heterogonous population (8 hrs) Variation in susceptibility and infectivity Ro in heterogonous population Next generation matrix Modelling vector borne diseases
Teaching strategy	Classroom teaching and software application

	Individual exercises Group work
Assessment criteria	Written exam Submission of assignment
Assessment strategy	Lecture attendance Correction of exam papers Evaluation of written assignment reports
Role of instructors and students	Instructors Prepared and ready to transmit, engage, practice, and apply knowledge and skills of the module by way of lecture, tutorial, demonstration, etc. to the students Use all teaching aids as needed Demonstrate data management and analysis Check that all computers in the lab are working, virus free, and soft wares are installed Have a knowledge of internet usage and addresses Prepare cases geared towards problem solving Guide students in any time as needed Students Prepared and ready to learn and keen to know more Be punctual in coming to classes and meeting deadlines of assignments Protect computers and accessories from damage and avoid disuse Develop computational skill Comply to all assignments forwarded from the instructor Upheld professional ethics and more in the class, in the lab and during tutorials
Teaching support and inputs	Computers Books Chapters in books Journals Internet relevant software

Module requirements	Prepared and ready to learn and keen to know more
	Be punctual in coming to classes and meeting deadlines of assignments
	Protect computers and accessories from damage and avoid disuse
	Develop computational skill
	Comply to all assignments forwarded from the instructor
	Upheld professional ethics and more in the class, in the lab and during visits (trips)
	Should pass all written examinations
	Should get pass mark in all reports of assignments
Module calendar	3 Weeks
Reading materials	Anderson RM, May RM. Infectious Diseases of Humans: Dynamics and Control. Oxford: Oxford University Press, 1991.
	Diekmann O, Heesterbeek JAP. Mathematical epidemiology of infectious diseases. Chichester: Wiley, 2000.
	Keeling MJ, Rohani P. Modeling Infectious Diseases in Humans and Animals. Princeton: Princeton University Press, 2007.
	Vynnycky E, White RG. An Introduction to Infectious Disease Modelling. Oxford: Oxford University Press, 2010.
	Models in the management of animal diseases, Publication of the Office international des épizooties (OIE), Scientific and Technical Review, Vol. 30 (2), 2011

14.2.5. Seminar on Current topics of Vet Epidemiology and Economics

- **Module code: VEPH-726**

- **Credit hours: 2**

Module title	Seminar on Current topics of Vet Epidemiology and Economics
Module code	VEPH-726
ECTS	7
Module type	Compulsory
Prerequisite module code	
Co-prerequisite module code	None
Barred combination	none
Description of module	The module is composed of *Basics of seminar Paper Writing and Seminar Preparation and Presentation.* Training of candidates in project writing and oral presentation skills will be conducted initially. Then guided pertinent and current research issues in the field of veterinary epidemiology and preventive medicine will be identified and comprehensive scientific report will be written for public presentation.
Learning outcomes	After completion of the module, the students would be able to: Learn procedures applied in scientific report writing Apply methods of preparing a presentation material appropriate for different types of audiences

	Organize and compile good quality scientific review papers in their future career
Content	Basics of Seminar paper writing (10%) Seminar preparation and presentation (90%)
Teaching strategy	Lectures Demonstrations Totops
Assessment criteria and evaluation	Students assessment is continuous and they are expected to learn through: Prepare and submit the seminar paper Present the seminar paper in public Should attend 80% of the classes Thus, the students final assessment is done using the following scheme: Lecture attendance Preparation of the seminar Presentation of the seminar
Assessment strategy	Lecture attendance Preparation of the seminar Presentation of the seminar *Module assessment*: Each student will give his /her module assessment report to the instructors in writing as feedback for the improvement of the module and delivery mechanisms.
Role of instructors and students	Instructors: provide knowledge, skill and important information during face-to-face learning using comprehensive teaching strategy (lecture, reading, tutorial, field visits, presentations) Help identify seminar topic Help search source

	Students:
	attend all units of the module to gain the listed learning outputs
	read materials or consult web-sites proposed by the module instructors
	be committed to work by way of seminar preparation and public presentation
Teaching support and inputs	Teaching of the module
	Handouts
	List of books or chapters in a book for the module
	Indicative reading material or web-sites (internet)
	Journals
	Computer and internet is required to get access to different web-based reading, journals and teaching material for the module
Module requirements	Every student taking the module should be prepared and ready to learn and keen to know more by attending at least 80% of the time given
	Be punctual in coming to classes
	Meeting deadlines of assignments
	Develop language skill
	Comply to all assignments forwarded from the instructor
	Upheld professional ethics and more in the class and in public forum
Module calendar	4 weeks
	10% of the module content will be covered by instructors through classroom teaching
	90% of the module content will be covered by students through seminar paper preparation and presentation
Reading materials	Text books, scientific journals, electronic materials