YEAR: Third
SUBJECT: Medical Entomology ……. (Theory)
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Medical Entomology …… (Theory)

Course module description:

This course presents the major insect, mite, and tick vectors of disease to man and animals. Students will learn to identify and understand the life cycles, morphology, and behavior of mosquitoes, ticks, mites, lice, fleas, and other disease vectors. Students also will learn about major arthropod-transmitted disease cycles, including malaria, Lyme disease, West Nile virus, leishmaniasis, and plague. The interaction between the disease-causing pathogen and the arthropod vector will be covered, including biological and mechanical transmission of pathogens as well as the mechanical damage that a parasite inflicts on its host.

Course/module academic calendar

week	Basic material to be covered	Hours
1	Introduction to Med & Vet Entomology	2
2	Classification of Arthropod-borne diseases	2
3	Hematophagy, disease transmission and epidemiology. Flies (Diptera) of Medical and Veterinary Importance	2
4	Moth flies: Leishmaniasis and Bartonellosis. Biting Midges (Ceratapogonidae)	2
5	Mosquito Taxonomy, Biology, and Behavior. Mosquito viruses: EEE, VEE, SLE, Yellow fever, West Nile virus	2
6	Mosquito surveillance. Malaria	2
7	Horse flies, Deer Flies: EIA, Anaplasmosis. Muscid flies	2
8	Myiasis (Muscoidea). Myiasis (Skin Bots and Grubs) and Louse flies	2
9	Black flies of Medical and Veterinary Importance. Filariasis: Mansonellosis, Onchocerciasis	2
10	. Lice of Medical and Veterinary Importance. Rickettsial Diseases: Epidemic Typhus, etc.	2
11	Mites: Rickettsialpox and Tsutsugamushi. Mites and Acariasis: Mange, Scabies, Chiggers	2
12	Spiders and Scorpions. Fleas (Siphonaptera) of Medical and Veterinary Importance	2
13	Lyme disease, Rocky Mountain Spotted Fever, Tularemia. True Bugs (Hemiptera): Kissing bugs and Bedbugs	2
14	Lepidoptera and Hymenoptera	2
15	Chagas Disease. Tsetse flies	2

Medical Entomology …… (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1	Venomous arthropods and arthropods causing allergies	2
2	Morphological adaptations of parasitic arthropods (mouthparts, wings, legs, antennae, body shape)	2
3	Pthiraptera, Siphonaptera, and Hemiptera	2
4	Nematoceran Diptera	2
5	Biting flies	2
6	Forensically important flies	2
7	Forensically important flies	2
8	Acari	2
9	Slides of vector-borne disease agents	2
10	Slides of vector-borne disease agents	2
11	Mosquito adults	2
12	Mosquito larvae	2
13	Geographic Information System (GIS) and statistics used in medical entomology	2
14	Geographic Information System (GIS) and statistics used in medical entomology	2
15	Final Exam.	2

Text Books:

- Medical and Veterinary Entomology, 2nd edition, Mullen and Durden, 2009, Academic Press.
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References

YEAR: Third
SUBJECT: Bio- fertilizer
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Bio-fertilizer …… (Theory Syllabus)

Course module description:

This course will provide an introduction to the natural history of the major groups of the Phylum Arthropoda that directly or indirectly impact the health of humans, pets and livestock. Classes will cover arthropod and parasite life-cycles, clinical signs and symptoms of disease, disease epidemiology, and approaches to control of arthropod-borne diseases with an emphasis on vector control. Recent advances in the field of medical/veterinary entomology research will be discussed and a number of medical/veterinary entomology case studies will be presented. This course is designed for entomology, biology, and medical students.

Course/module academic calendar

week	Basic material to be covered	Hours
1	An introduction to fertilizers, synthetic fertilizers, natural fertilizers,	2
2	inorganic fertilizers, organic fertilizers, bio-fertilizers - importance, advantages and constraints.	2
3	Isolation, culturing methods, enumeration and identification of microbial species - Rhizobium,	2
4	Azospirillum Azotobacters, blue green algae and phosphate solubilisers.	2
5	Morphology of Rhizobium, Azospirilium, Azotobacters,	2
6	Morphology of blue green algae and phosphate solubilisers and maintenance - inoculant preparation.	2
7	Preparation of microbial inoculants - large-scale production of microbes - their application as biofertilizers - crop responses to biofertilizers.	2
8	Preparation of microbial inoculants - large-scale production of microbes - their application as biofertilizers - crop responses to biofertilizers.	2
9-10-11	Azolla - distribution, morphological and biochemical characteristics - cyanobacterial symbionts - azolla biofertilizer technology - organic matter and composting - method of processes, applications and limitations.	2
12	Quality Control of Bio-fertilizer ,	2
13	Advantages of Bio- fertilizer in agriculture	2
14	Bio-pesticides: Introduction, types, Future Perspective of Bio- Fertilizer and Bio-pesticides	2
15	Bio-pesticides: advantages, disadvantages and future perspective, Precautions that should be Taken While using Bio- fertilizer and Bio-pesticides	2

Bio-fertilizer …… (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	
1	Introduction to Bio-fertilizer Lab.	
2	General Methods to Evaluate of Microbial activity: Isotopic Methods (N2- fixing activity, P- Solubilizing Activity)	
3	Conventional Methods (N- Fixing Activity, P- Solubilizing Activity)	
4	Carriers of Bio-fertilizer: Carries Materials ,	
5	Carriers Sterilization Using γ Irradiation	
6	Inoculants for bio-fertilizer: Rhizobium Inoculants (Isolation of Rhizibium Strains)	
7	Inoculants for bio-fertilizer: Rhizobium Inoculants Production (Production of Broth Culture, Production of Sterile Carrier-based inoculants, Production of Liqued Inoculant.	
8	Non –symbiotic Nitrogen Fixers (Azospirillum ,other associative Nitrogen Fixing Bacteria.	
9	Isolation of Microbial Strains (Isolation of Endophytic Bacteria from grass /rice roots)	
10	Evaluation of N_2 Fixation Associative Nitrogen Fixing Bacteria.	
11	Inoculants Production : Associative Nitrogen Fixer , Mass Inocla Production	
12	Mycorrhiza : Isolation , Benefits of Mycorrhizal Bio-fertilizer,	
13	Isolation of Arbuscular Mycorrhizal Fungi	
14	Application of Bio-fertilizer from associative Nitrogen fixing Bacteria (Binifit of fixing Bio-fertilizer, Procedures for Growing of Corn using Bio-fertilizer inoculated Seeds in Iraq	
15	Tips on Buying and storage of Bio-fertilizer,Cuastions & Limitations of Bio-fertilizers	

Text Books : Bio-Fertilizer Manual : forum for nuclear Cooperation In Asia (FNCA)

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References

YEAR: Third
SUBJECT: Bio-Separation
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Bio-Separation …… (Theory Syllabus)

Course module description:

This course will provide an introduction to the natural history of the major groups of the Phylum Arthropoda that directly or indirectly impact the health of humans, pets and livestock. Classes will cover arthropod and parasite life-cycles, clinical signs and symptoms of disease, disease epidemiology, and approaches to control of arthropod-borne diseases with an emphasis on vector control. Recent advances in the field of medical/veterinary entomology research will be discussed and a number of medical/veterinary entomology case studies will be presented. This course is designed for entomology, biology, and medical students.

Course/module academic calendar

week	Basic material to be covered	Hours
1	Overview of bio-separations engineering: Introduction, What is separated in bio-separation? Economic importance of bio-separation, Nature of bio-separation, Basis of separation in bio-separation processes, Physical forms separated in bio-separation, Bio-separation techniques, The RIPP scheme, Example of bio-separation, Current trends in the bio-separation	1
2	Properties of biological material: Introduction, Size, Molecular weight, Diffusivity, Sedimentation coefficient, Osmotic pressure, Electrostatic charge, Solubility, Partition coefficient, Light absorption, Fluorescence	2
3	Mass transfer: Introduction, Molecular diffusion in liquid medium, Measurement of diffusivity, Estimation of diffusivity, Diffusion of solutes in dense solid, Diffusion of solutes in porous solid, Convective mass transfer,	3
4	Experimental determination of mass transfer coefficient, Estimation of mass transfer coefficient, Inter-phase mass transfer, Unsteady state mass transfer, Equilibrium and rate processes	4
5	Cell disruption: Introduction, Cells, Cell disruption using bead mill, Cell disruption using rotor-stator mill, Cell disruption using French press, Cell disruption using ultrasonic vibrations, Cell disruption using detergents, Cell disruption using enzymes, Cell disruption using organic solvents, Cell disruption by osmotic shock	5
6	Precipitation: Introduction, Factors utilized for precipitation, Precipitation using organic solvents, Precipitation using anti-chaotropic salts, Mechanism of precipitate formation	6
7	Centrifugation: Introduction, Laboratory centrifuge, Preparative centrifuge, Ultracentrifugation	7
8	First exam	8

9	Extraction: Introduction, Solvent systems, Theory of extraction, Aqueous two-phase extraction, Batch extraction, Single-stage continuous extraction using immiscible solvents, Batch extraction using partially miscible solvents, Cross-current continuous extraction using immiscible solvents, Staged counter-current extraction, Differential extraction, Supercritical fluid extraction	9
10	Adsorption: Introduction, Adsorbents, Separation mechanisms, Adsorption isotherms, Diffusional limitations in adsorption processes, Batch adsorption, Packed bed adsorption, Other types of adsorption devices	10
11	Chromatography: Introduction, Chromatography system, Theory of chromatography, Shape and yield of a chromatographic peak, Binary chromatography, Hydrodynamic chromatography	11
12	Filtration: Introduction, Theory of filtration, Filter medium, Driving force, Constant pressure cake filtration, Constant rate cake filtration, Improvement of filtration efficiency, Mode of operation, Filtration equipment	12
13	Membrane based bioseparation: Introduction, Classification of membrane processes, Membrane equipment, Ultrafiltration, Microfiltration, Dialysis, Liquid membrane processes, Membrane chromatography	13
14	Miscellaneous bioseparation processes: Introduction, Electrophoresis, Affinity ultrafiltration, Field-flow fractionation	14
15	Final Exam.	15

Bio - Separation ..... (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1		2
2		2
3		2
4		2
5		2
6		2
7		2
8		2
9		2
10		2
11		2
12		2
13		2
14		2
15		2

Text Books

References

YEAR: Third
SUBJECT: Antibiotics
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Antibiotics …… (Theory Syllabus)

Course module description:

This course will provide an introduction to the natural history of the major groups of the Phylum Arthropoda that directly or indirectly impact the health of humans, pets and livestock. Classes will cover arthropod and parasite life-cycles, clinical signs and symptoms of disease, disease epidemiology, and approaches to control of arthropod-borne diseases with an emphasis on vector control. Recent advances in the field of medical/veterinary entomology research will be discussed and a number of medical/veterinary entomology case studies will be presented. This course is designed for entomology, biology, and medical students.

Course/module academic calendar

week	Basic material to be covered	Hours
1	Introduction, definition, characteristics of ideal antibiotics, history of antibiotics, terminologies, applications	2
2	Classification of antibiotics: according to spectrum, effectiveness, mode of action and chemical structure.	2
3	Classification based on chemical structure (the code system of Berdy): families and subfamilies of antibiotics	2
4	Classification based on chemical structure: families and subfamilies of antibiotics	2
5	Classification based on mechanism action: cell wall inhibitors, protein synthesis inhibitors, nucleic acid inhibitors, cytoplasmic membrane inhibitors and Folate metabolism inhibitors	2
6	Penetration of antibiotics into the cell. Factors that influence transmembrane movement of antibiotics.Modes of resistance to antibiotics	2
7	Production of antibiotics from microorganism: the concept of idiophase and trophase. Primary and secondary metabolism in relation to antibiotics production	2
8	Ecological role of antibiotics in nature. Antibiotics in regulation of metabolism	2
9	Role of antibiotics in differentiation of producing microorganisms.	2
10	Isolation of antibiotics. Isolation of the microorganisms. Classical tests & modern methods in primary screening techniques. Secondary screening techniques.	2
11	Extraction and purification of antibiotics. Fractionation of antibiotics. Chromatography & electrophoresis. Characterization techniques, Hamill's scheme & Bostian computer system.	2
12	Quantitative determination of antibiotics: Diffusion methods, turbidimetric methods, respirometric method & antibiotic sensitivity tests.	2
13	Choice & administration of antibiotics to humans. Absorption, Distribution, Localization in tissues, Biotransformation and Excretion.	2

14	Usage of antibiotics, in medicine, veterinary and animal feed; in agriculture and the food industry.	2
15	Non-antibiotics chemotherapeutic agents	2

Antibiotic ..... (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1	Instruments and tools used in the antibiotics laboratory. Media used in antibiotics isolation and sensitivity tets	2
2	Classification of antibiotics according to mode of action and chemical structure. Mechanism of antibiotics resistance	2
3	Microorganism producing antibiotics: definition, characteristics, types of antibiotics which produce from them	2
4	Microorganism producing antibiotics: definition, characteristics, types of antibiotics which produce from them	2
5	Method of screening of antibiotics from soil: primary isolation, colony selection and inoculation and evidence of antibiosis and conformation	2
6	Method of screening of antibiotics from soil: primary isolation, colony selection and inoculation and evidence of antibiosis and conformation	2
7	Isolation and Identification of Microorganisms producing antibiotics	2
8	Isolation and Identification of Microorganisms producing antibiotics	2
9	Method of extraction and purification of antibiotics part I	2
10	Method of extraction and purification of antibiotics part II	2
11	Method of extraction and purification of antibiotics part III	2
12	Antibiotic sensitivity test using disk diffusion method	2
13	Antibiotic sensitivity test using agar diffusion method	2
14	β-lactamase and extended beta lactamase tests	2
15	Determination of MIC and MBC of antibiotics	2

Text Books

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References

YEAR: Third
SUBJECT: Virology
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Virology …… (Theory syllabus)

Course module description:

Virology course provides an introduction and overview of core concepts and major virus families after these course students will be able to identify key features and prototypes of each virus family covered as well as classify those viruses based on structural characteristics. In addition, students will demonstrate that they can analyze and discuss virological causes of pathogenesis while evaluating primary peer reviewed virology research.

Course/module academic calendar

week	Basic material to be covered	Hours
1	Virology: History & Terminology	2
2	Structure of Viruses **: (**Viral genomes, proteins, and lipids Prions and Viroids), Physical characterization) Virus Transmission, Attachment and Entry,	2
3	Taxonomy , Viral Evolution, Animal Virology, Viruses of simple eukaryotes, Plant viruses,	2
4	DNA & RNA Virus types : Genome Replication and Expression	2
5	Molecular virology -1: Attachment to host cells, Virus entry into host cells, Genome Replication and mRNA production by RNA viruses	2
6	Molecular virology -2: Retroid viruses: Reverse transcription, Transcription strategies: DNA templates, Genome replication	2
7	: Molecular virology-3 : DNA viruses, Translational control of viral gene expression, Intracellular transport of viral components	2
8	Real life-1 : Infection, Dissemination, virulence and epidemiology, Virus offense meets host defense:	2
9	Real life-2 : innate immunity, Patterns of infection: a delicate balance, Viral transformation and oncogenesis, Prevention and control ,	2
10	The herpes viruses	2
11	Retroviruses and AIDS Orthomyxovirues and influenza	2
12	Control of viral disease by immunization	2
13	How viruses cause disease	2
14	Actual Virology : HIV & Hepatitis pathogenesis, Vaccines.	2
15	Antiviral chemotherapy	2

Virology…… (Practical syllabus).

Course/module academic calendar

week	Basic material to be covered	Hours
1	Virology lab check-in & introduction to cell culture techniques p. 5 Dilution exercises	2
2	Transfection to construct recombinant virus	2
3	Plaque assay to titer transfection	2
4	Plating virus for plaque screening	2
5	Plaque screening and plaque purification I	2
6	Plaque purification II	2
7	Plaque purification III	2
8	Virus scale-up I	2
9	Virus scale-up II	2
10	Isolation of baculovirus DNA Chemotaxis experiment	2
11	Analysis of baculovirus DNA Infections with recombinant viruses	2
12	Protein gels: staining and transfer	2
		2
		2
		2

Text Books

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References

YEAR: Third
SUBJECT: Immunology
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Immunology ……. (Theory)

Course module description:

Basic Immunology: An introduction to the immune system, with emphasis on mammalian models. Lecture includes discussions on generation of humoral and cell-mediated immune responses, antigen and antibody structure and function, transplantation and tolerance, and immunopathologies.

Course/module academic calendar

week	Basic material to be covered	Hours
1	Introduction to immunology, History and Overview of innate and adaptive	2
2	Cells of the immune system, Organs of the immune system, Innate immunity, Adaptive immunity	2
3	Antigens, Antibodies – structure, Antibodies – classes	2
4	Major Histocompatibility complex	2
5	Antigen processing and presentation	2
6	(T cell receptor, T cell maturation,	2
7	B cell generation/mat,uration , T-Cell & b-Cell Activation,	2
8	Immune effectors mechanisms: complement,	2
9	Immune effectors mechanisms: cellular immunity, Hypersensitivity reactions – Type I & type II,	2
10	Transplantation immunology , Cancer and the immune system	2
11	Generation of B cells–their Selection and Heterogeneity	2
12	Immune Response to Bacteria & viruses	2
13	Hypersensitivity and immunologic Injury mucosal Immunology, Humoral Immune Response	2
14	Mechanisms of Tolerance and Autoimmunity	2
15	Diagnostic Immunology	2

Immunology ……. (Practical)

Course module academic calendar

week	Basic material to be covered	Hours
1	Introduction of Immune Lab, Laboratory Safety/ Student Surveys/Use of Micropipettes	2
2	Immunological Lab Equipments: Haemocytometer, ELISA reader, Gamma Coounter, Electrophoresis unit,	2
3	Making Buffers, Experimental Design,Immunohistology and Cell Counting	2
4	Immuno-precipitation	2
5	Ouchterlony's immuno diffusion technique	2
6	Counter current immuno-electrophoresis	2
7	Agglutination: Haemagglutination & Blood typing / grouping	2
8	Enzyme linked immunosorbant assay(ELISA), Western Blots,	2
9	Immunoglobulins purification -1	2
10	Immunoglobulins purification-2	2
11	Differential (Identification of cell types) & Total leukocyte counts of blood	2
12	Isolation & Viability determination of Lymphocytes from peripheral blood.	2
13	Lymphocyte proliferation with mitogen and migration with capillary tubes	2
14	Identification of cell types by receptors – Rose test, Immunofluorsence.	2
15	Raising of antibodies in animals – Polyclonal antibodies.	2

Text Books

References

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YEAR: Third
SUBJECT: Enzymolog
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Enzymes Technology ……. (Theory Syllabus)

Course module description:

This course will introduction the enzymology . Syllabus of this course will emphasize on the development specificity methods for extraction, isolation and purification of enzymes . This course will emphasize on mechanisms of enzyme action, enzyme inhibitions and multi-substrate reactions - mechanisms as well as allosteric regulation of enzymes . this course also emphasize on Immobilized enzymes and Commercial production of enzymes such as amylases, proteases, cellulose, artificial enzymes, industrial applications.

Course module academic calendar

week	Basic material to be covered	Hours
1	(Introduction, enzyme classification & nomenclature of enzymes (IUB	2
2	Enzyme extraction, isolation	2
3	Enzyme extraction, isolation	2
4	purification of enzyme by various methods	2
5	purification of enzyme by various methods	2
6	Mechanism of enzyme action - concept of active site	2
7	Energetic of enzyme substrate complex formation, specificity of enzyme action	2
8	kinetics of single substrate reactions - turnover number - estimation of Michaelis - Menten's parameters	2
9	multi-substrate reactions - mechanisms & kinetics; allosteric regulation of enzymes	2
10	Enzyme inhibitions - kinetics of competitive, non-competitive & uncompetitive inhibitions, nucleophilic & electrophilic attack; role of metal ions in enzyme catalysis	2
11	Immobilized enzymes - principles & techniques of immobilization	2
12	Commercial production of enzymes; amylases, proteases, cellulose, artificial enzymes, industrial applications, fermentation, enzymes modification, site directed mutagenesis; immobilized enzyme in industrial processes	2
13	Commercial production of enzymes; amylases, proteases, cellulose, artificial enzymes, industrial applications, fermentation, enzymes modification, site directed mutagenesis; immobilized enzyme in industrial processes	2
14	Structure and function of coenzyme - reactions involving TPP, pyrodoxal phosphate, nicotinamide, flavin nucleotide, coenzyme A and biotin	2
15	Industrial utilization of enzymes, food, detergents, energy, waste treatment, pharmaceuticals and medicine	2

Text Books :

Reference

Enzymology ……. (Practical Syllabus)

. **Course module academic calendar**

week	Basic material to be covered	Hours
1	Introduction . equipments of course	2
2	Enzymes extraction	2
3	Enzymes extraction	2
4	Enzyme extraction	2
5	Enzyme purifiction	2
6	Enzyme purifiction	2
7	Enzyme purifiction	2
8	Mechanism of enzyme action and reaction	2
9	Mechanism of enzyme action and reaction	2
10	estimation of Michaelis - Menten's parameters	2
11	multi-substrate reactions - mechanisms	2
12	Immobilized enzymes & techniques of immobilization	2
13	Commercial production of enzymes; amylases, proteases, cellulose, artificial enzymes, industrial applications, fermentation	2
14	Industrial utilization of enzymes, food, detergents, energy, waste treatment, pharmaceuticals and medicine	2
15	Industrial utilization of enzymes, food, detergents, energy, waste treatment, pharmaceuticals and medicine	2

Text Books :

References :

YEAR: Third
SUBJECT: Sera & Vaccines
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Sera & Vaccines …… (Theory Syllabus)

Course module description:

The main objectives of this course are to introduce students to the primary scientific literature and the process of reading research publications as well as to expose students to the rapidly developing field of sera and engineering vaccines and immunotherapies. By the end of the course students should :

1. Have a broad understanding of basic engineering principles that have been applied to sera and vaccine design.
2. Understand how immunotherapies can be used to control and regulate disease.
3. Have basic knowledge of how close each discussed engineering approach is to clinical implementation (e.g. FDA-approved, clinical trials, pre-clinical trials, conceptual).
4. Be able to critically evaluate the primary research literature

Course/module academic calendar

week	Basic material to be covered	Hours
1	introduction & history	2
2	serological diagnostic methods **part one**	2
3	serological diagnostic methods **part two**	2
4	Kinds of immunization	2
5	Guideline on adjuvant in vaccines	2
6	Lived, killed & attenuated	2
7	1st Examination	2
8	Vaccines administration	2
9	Vaccine Strategies	2
10	Viral Vaccine	
11	Preparation of Vaccine	2
12	Newer strategies for vaccine development	2
13	Process for the preparation of a vaccine for the treatment of intracellular infectious diseases	2
14	New methods of vaccine production	2
15	2nd Examination	2

Sera & Vaccines ..... (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1		2
2		2
3		2
4		2
5		2
6		2
7		2
8		2
9		2
10		2
11		2
12		2
13		2
14		2
15		2

Text Books

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References

YEAR: Third
SUBJECT: Plant tissue Culture
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Plant tissue Culture …… (Theory Syllabus)

Course module description:

This course provides graduate-level knowledge of and expertise in plant tissue culture theory and practice. This course has a vocational focus and introduces the student to the theory and practice of plant tissue culture and their role from modifying plants in plant biotechnology to the propagation of endangered plants and from modifying cell lines in biotechnology to the propagation of all lines for use in medical, microbiological and biochemical research. Finally the aim of this course to introduce students to the principles, practices and application of plant tissue culture and transformation in science, agriculture and industry.. (RMIT Uni.)

Course/module academic calendar

week	Basic material to be covered	Hours
1	Introduction and Course Overview	2
2	Plant Tissue Culture - Introduction	2
3	PLANT TISSUE CULTURE TECHNIQUES Definitions: Organized growth vs. unorganized growth. Types of Explants	2
4	Callus initiation	2
5	Cell Suspension Cultures Factors affecting the success of the cultures	2
6	Protoplast culture	2
7	protoplasts fusion	2
8	Plant chimeras in tissue Culture	2
9	Plant chimeras in tissue Culture	2
10	In Vitro Developmental Pathways	
11	Hormones	2
12	Micro propagation and Contamination	2
13	Applications of Somatic Hybridization and Cybridization	2
14	Artificial seeds	2
15	Plant Biotechnology-1 Agrobacterium-mediated transformation	2

Plant tissue Culture..... (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1	Tour of the Plant Tissue Culture lab + safety regulations.	2
2	Mastering Aseptic Technique basics. Media Composition and Preparation	2
3	Contamination Testes	2
4	Aseptic Oat Germenation	2
5	Seed Germination Initiate callus from different types of explants	2
6	Study of the effect of Concentration of chemicals and time of Sterilization on Explants.	2
7	Initiation of Axenic Shoot Cultures.	2
8	Shoot Tip Cultures of Sweet & White Potato	2
9	Micropropagation of Anthurium andreanum	2
10	Effects of various levels of hormones on explants	2
11	Effects of various levels of hormones on explants	2
12	Selection Of Callus Sectors GUS Assays	2
13	Selection Of Callus Sectors GFP Assays	2
14	Transgenic seeding screens	2
15	Final Exam.	2

Text Books

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References

YEAR: Third
SUBJECT: Embryology
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Embryology …… (Theory Syllabus)

Course module description:

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Course/module academic calendar

week	Basic material to be covered	Hours
1	Introduction to Embryology – It covers the theoretical concepts of Human Embryology	2
2	Infertility and its clinical management – It covers concepts in infertility, its diagnosis and treatment strategies.	2
3	Andrology – It covers concepts in male infertility, theoretical as well as practical knowledge of andrology lab.	2
4	IVF procedure: Fertilisation, Embryo production & Cryopreservation techniques (theory) – This unit introduce the students with the skills and techniques used in the IVF lab	2
5	IVF procedure: Fertilisation, Embryo production & Cryopreservation techniques (practical) – It involves extensive practical training in IVF lab. Student are expected to complete 50 murine IVF cycle as well as assist faculty embryologist in 50 IVF human cases efficiently.	2
6	Intracytoplasmic sperm injection (ICSI) - It involves extensive practical training in ICSI. Student are expected to complete 30 murine ICSI cycle as well as assist faculty embryologist in 20 ICSI human cases efficiently	2
7	QC, QA and Record keeping in ART – It covers the total quality management principles involved in ART lab	2
8	Ethics and regulation in ART - It covers the knowledge about the regulation and ethical issues involved in ART.	2
9	Cytogenetics – It covers the theoretical knowledge and understanding of techniques used in cytogenetics. Students will have practical exposure to essential techniques like FISH, karyotyping, etc	2
10	Project Work, Presentation & Publications	
11	Fellowship Examination- Terminal Exam by MCQs	2
12		2
13		2
14		2
15		2

Embryology..... (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1		2
2		2
3		2
4		2
5		2
6		2
7		2
8		2
9		2
10		2
11		2
12		2
13		2
14		2
15		2

Text Books

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References

YEAR: Third
SUBJECT: Seed Biotechnology
THEORITICAL HOURS: 2
PRACTICAL HOURS: 2
UNITS: 3

Seed Biotechnology …… (Theory Syllabus)

Course module description: jan_spears@ncsu.edu California

This course aimed to an exploration of seeds, how seeds are the delivery system for crop biotechnology and how a specific culture's perception of science and agriculture influence the acceptance or rejections of modern genetic technologies. Topics include seed germination, survival and preservation; seed industry influence on societies and how societies are influencing the seed industry; seed production - commercially and at home; how our diverse genetic resources are preserved; how biotechnology is applied to agriculture and delivered through seeds; the impact biotech is having on the seed industry and subsequently on us and global agriculture; concerns and potential benefits of biotechnology application to crops.

Course/module academic calendar

week	Basic material to be covered	Hours
1	Seed Biotechnology : Overview – concept, definition and landmarks	2
2	Flowering and Pollination	2
3	Seed development and Maturation	2
4	Seed Germination	2
5	Seed Production and Certification	2
6	Water Relation on Seeds	2
7	The Chemistry on Seeds , Seed dormancy	2
8	Seed Health and Phytosanitation , Seed Deterioration	2
9	Harvesting and Conditioning	2
10	Seed Vigor and viability	
11	Seed Storage and Longevity	2
12	Seed Biotechnology	2
13	Seed Enhancement	2
14	Terminator Technology	2
15	Final Exam.	2

Seed Biotechnology..... (Practical Syllabus)

Course/module academic calendar

week	Basic material to be covered	Hours
1		2
2		2
3		2
4		2
5		2
6		2
7		2
8		2
9		2
10		2
11		2
12		2
13		2
14		2
15		2

Text Books

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References