

MSc PLANT PRODUCTION AND PROTECTION PROGRAMME DESCRIPTION

A. AIMS AND OBJECTIVES:

A.1. Aim

To equip potential horticultural entrepreneurs, extension officers and researchers with sound knowledge on the composition of different plant production systems and the interaction of the organisms in these systems as well as the requisite skills to establish and manage sustainable plant production systems.

A.2. Objectives:

At the end of this programme students should be able to:

1. describe the physical and ecological features of different plant production systems
2. outline the various ecological interactions and cycles that occur in different plant production systems and their impact on the productivity and sustainability of these systems
3. conduct qualitative and quantitative assessments of the organisms and requisites in plant production systems
4. design and establish different plant production systems
5. develop and implement various interventions and management strategies for the protection of plants
6. evaluate the impact of natural events and human activities on plant production and productivity
7. state factors to be considered during harvesting, storage and transport of produce
8. execute sound research and monitoring for providing solutions to problems related to plant production systems.

C. ACCESS AND SUPPORT

C1. Criteria for admission.

B. Sc. honours degree in biological, agricultural or environmental sciences.

C2. Mode(s) of delivery

The programme will be delivered using a variety of mechanisms including face-to-face lectures, seminars, tutorials, field visits and a research project. It will also include a project and scenario-based workshops, case studies and assignments in which group work and student-centred learning approaches will be used. Students will be encouraged to take responsibility and control of their own learning. This will culminate in the final research project in which students will be responsible for the conduction and reporting of a project with the assistance of a supervisor who is an expert in the chosen area.

The programme will be taught part-time with 5:00 to 8:00 p.m. delivery of lectures/tutorials and seminars; with laboratory sessions and field trips on Saturdays. This will be supported by the UWI course management programme OurVLE.

D. COURSE OF STUDY

D1. PROGRAMME STRUCTURE - MSc. PPP

Course Code	Course Title	Credits
	Production Courses	15
BIOL6020	Plant Propagation, Cropping Systems and Communities	3
BIOL6021	Agroecosystems and Climates	3
BIOL6022	Agroecosystems and Soils	3
BIOL6023	Harvesting and Postharvest Technology	3
BIOL6024	Plant Breeding Perspectives	3
	Protection Courses	18
BIOL6025	Principles of Phytopathology	3
BIOL6026	Plant Diseases: Biology, Ecology and Management	6
BIOL6027	Applied Insect Biology	3
BIOL6028	Ecology and Management of Arthropod Pests of Plants	3
BIOL6029	Weed Biology, Ecology and Management	3
	General	12
BIOL6114	Research Methods and Project Management	3
BIOL6110	Research Project	9
	TOTAL CREDITS	45

THE DIPLOMAS

- A Diploma in Plant Production will be awarded to persons completing 15 credits of production courses, 3 credits from the weeds course and 6 credits from any other graduate course(s).
- A Diploma in Plant Protection will be awarded to persons completing 18 credits of protection courses and 6 credits from any other graduate course(s).

D2. Delivery Schedule

Year 1

Semester 1 13 wks. of teaching: September to November.

Three courses taught singly and each lasts for 4 weeks.

Week 1 – 4	BIOL6114 - Research Methods and Project Management	
Week 5 - 8	BIOL6020 - Plant Propagation, Cropping Systems and Communities	
Week 9 - 12	BIOL6025 - Principles of Phytopathology	
Week 13	Course work collection / assessment	1 wk.
Week 14	1 st semester examinations	3 wks.
Christmas Break:	3 wks. December to mid-January	

Semester 2 13 wks. of teaching: January to April.

Week 1 – 4	BIOL6022 - Agroecosystems and Soils	
Week 5 - 8	BIOL6027 – Applied Insect Biology	
Week 9 – 12	BIOL6024 - Plant Breeding	
Week 13	Course work collection / assessment	1 wk.
Week 14	1 st semester examinations	3 wks.

Year 2

Semester 1 13 wks. of teaching: September to November.

Two courses taught singly, lasting 4 and 8 weeks, respectively.

Week 1 – 4	BIOL6023 - Harvesting and Postharvest Technology	
Week 5 - 12	BIOL6026 - Plant Diseases: Biology, Ecology and Management	
Week 13	Course work collection / assessment	1 wk.
Week 14	1 st semester examinations	3 wks.
Christmas Break:	3 wks. December to mid-January	

Semester 2 13 wks. of teaching: January to April.

Week 1 – 4	BIOL6021- Agroecosystems and Climate	
Week 5 - 8	BIOL6029 - Weed Biology, Ecology and Management	
Week 9 – 12	BIOL6028 - Ecology and Management of Arthropod Pests of Plants	
Week 13	Course work collection / assessment	1 wk.
Week 14	1 st semester examinations	3 wks.

Semester 3 (Summer Period): 10 wks. June – July/August

BIOL6110 – Research Project 7 wks.

The project must be submitted for examination by the end of August.

Length of programme: 5 semesters (part time). This excludes time taken for examination of the project.

Weekly Schedule:

Each Course will have:

6 hours of lecture/tutorials/seminars

Two evenings per week- 5:00 – 8:00 p.m. each. (Monday to Thursday)

7.5 hours of laboratory/field trips

Saturday (9 a.m. – 5:30 p.m.) with 1 hr. for lunch.

If traveling time is required for field trips the period becomes 8 a.m. to 6:30 p.m. (~2 hrs. for traveling) with 1 hr. for lunch.

Total Contact and Credit hours for each course

6 hours of lecture/tutorials/seminars per week for 4 weeks = 24 hours of contact and 24 credit hours

7.5 hours of labs/field trips per week for 4 weeks = 30 hours of contact and 15 credit hours

Total Contact hours = 54 and total Credit hours for each course = 39.

In Year 1 the course load per semester for the M.Sc. will be 3 courses in each of the Semesters 1 and 2, totalling 18 credits.

In Year 2 the course load will be 2 courses in Semester 1 (9 credits) and 3 courses in Semester 2 (9 credits).

BIOL6021 Agroecosystems and Climate
 3 credits Semester 2 Level: Graduate

Aims:

1. To provide students with an understanding of the roles of climate and microclimate in plant growth.
2. To equip students with knowledge on how agroecosystems can be managed to improve plant productivity under different climatic conditions, with a focus on sustainability in the Caribbean context.

Objectives: On successful completion of this course, students should be able to:

1. Explain how the influence of environmental factors on the energy balance in plants determines productivity;
2. Identify the various means by which light, temperature and rainfall determine plant growth and development;
3. Describe the effects on plant production of extreme climatic conditions and means to mitigate them;
4. Evaluate the means of managing agroecosystems in a sustainable manner to make best use of climatic and microclimatic conditions for plant production;
5. Explain and assess potential effects of climate change on plant productivity.

Syllabus:

1. Plant productivity: balance of respiration, photorespiration and photosynthesis; photosynthate distribution.
2. Importance of light: light quality and intensity; relationship with leaf area index; influence of the canopy; diurnal and seasonal variation; photoperiodism.
3. Temperature: effects on plant productivity; limits to production.
4. Rainfall: types of precipitation; effect of drought and flood on plant production and means of mitigation.
5. Microclimate: introduction to its management under protected agriculture.
6. Wind: effects on plant production; mitigation of wind damage.
7. Climate change: potential effects on plant productivity; introduction to simulation models.

Practical exercises will be conducted on these topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50 %
	Coursework	50 %
	Field and laboratory reports (4 x 5%)	(20 %)
	Mid-course quiz	(15 %)
	Term paper	(15 %)

Prescribed Text: Smith, J. W. 2008. Agricultural Meteorology: The Effect of Weather on Crops. Caffin Press. - ISBN 1408666634.

BIOL6022 Agroecosystems and Soils

3 credits

Semester 2

Level: Graduate

Aims:

1. To provide students with an understanding of the relationships between soils, crop plants and agroecosystems.
2. To equip students with the knowledge of how farming systems and soil factors can be managed sustainably to improve productivity and reduce environmental degradation, with a focus on Caribbean agriculture.

Objectives: On successful completion of this course, students should be able to:

1. Explain the role of soils in the context of agroecosystems
2. Describe the basic physical, chemical and biological characteristics of cultivated soils and their measurement
3. Assess the basic physical, chemical and biological characteristics of cultivated soils
4. Explain the influence of soil type on the availability of water and nutrients to plants
5. Define the concept of soil fertility and describe how it is assessed; explain how it can be improved and maintained by fertilization and other management practices;
6. Identify soil factors that are constraints to plant production
7. Classify types of soil erosion and means of soil conservation in agroecosystems.

Syllabus:

1. Characteristics of the agroecosystem and the role of the soil component.
2. The cultivated soil: characteristics and their measurement; preparation of soil for plant cultivation in fields, greenhouses and nurseries.
3. Water availability: effects of soil type; irrigation and drainage.
4. Mineral nutrition: fertility of different soil types; methods of assessing soil fertility, the maintenance of soil fertility in agroecosystems by inorganic and organic fertilization and other agronomic practises.
5. Soil constraints to plant growth: extreme pH; salinity; heavy metals; pollution.
6. Soil erosion and conservation: erosion by water and wind; conservation by appropriate agroecosystems and cultivation methods.

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50 %
	Coursework	50 %
	Field and laboratory reports (4 x 5%)	(20 %)
	Mid-course quiz	(15 %)
	Term paper	(15 %)

Prescribed Text: Parker R. 2009. Plant & Soil Science: Fundamentals & Applications. Delmar Cengage Learning. - ISBN 1428334807.

BIOL6023 **Harvesting and Postharvest Technology**
3 credits Semester 1 Level: Graduate

Aim: To equip students with an understanding of the development and other changes in plants from pre- to post- harvesting, the management practices involved in harvesting, handling, storage and transport and the Best Postharvest Practices (BPHP) of fresh crops.

Objectives: On successful completion of this course, students should be able to:

1. Determine readiness for harvesting and describe harvesting practices for a range of plant produce
2. Explain physiological and biochemical changes occurring after harvesting for the main types of plant produce
3. Evaluate methods of transport and storage for these types of plant produce
4. Evaluate the physiological disorders and diseases of stored commodities and their control
5. Evaluate and implement postharvest technologies to preserve and extend shelf-life of fresh produce

Syllabus:

1. Determinants of readiness for harvest
2. Harvesting practices
3. Post-harvest changes and loss of value
4. Ripening and senescence of fruits
5. Postharvest Diseases and Disorders of Fruits and Vegetables
6. Preparation for storage
7. Storage and transport
8. Preservation Technologies

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50%
	Coursework	50%
	Field and laboratory reports (5 x 5%)	(25%)
	Term Paper	(12.5%)
	Oral Presentation/Seminar	(12.5%)

Prescribed Texts: Kays S. J and Paull R. E. 2005. Postharvest Biology. Exon Press, Athens, GA.
Paliyath, G., Murr, D.P. Handa, A.K. Lurie, S. 2008. Postharvest Biology and Technology of Fruits, Vegetables, and Flowers. Wiley-Blackwell, London.

Rationale: Unless properly managed, loss can be high in the final stages of the plant production process, which are just as important as the earlier stages of plant growth and development. This course addresses the biological and management factors operating at harvesting, storage and transport.

BIOL6024 Plant Breeding Perspectives
3 credits Semester 2 Level: Graduate

Aim: To provide an understanding of breeding sexually as well as asexually propagated crops with major emphasis on sustainable agriculture.

Objectives: Upon successful completion of this course the students should be able to:

1. Design breeding strategies that would lead to an increase in the productivity and profitability for the farmers in agriculture and horticulture.
2. Utilize plant breeding to mitigate the impact of chemicals used to control crop pests and diseases avoiding the damage to the environment.
3. Use plant breeding strategies in developing sustainable agricultural/horticultural production systems that would satisfy an ever increasing demand for food, fiber and plant based industrial products.
4. Start seed production enterprise in the Caribbean region for the local and international markets.

Course Content:

1. Domestication (Evolution) of crop plants. Why breed crop plants?
2. Breeding systems of a crop.
3. Breeding self- pollinated and cross -pollinated crops.
4. Breeding asexually propagated crops, mutation breeding.
5. Breeding for biotic and abiotic stress factors.
6. Genetic diversity and gene banks.
7. Genetic engineering, generating transgenic crop plants.
8. Detecting genetic linkages of molecular markers with the morphological and quantitative trait loci (QTLs), marker assisted selection (molecular breeding), and other non-conventional techniques for crop breeding
9. Seed production (for agriculture/horticulture sector) and seed certification in the Caribbean.

Practical exercises to support above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical Exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50%
	Course work	50%
	One 2-hour lab. Examination	(20%)
	Lab. Reports	(20%)
	Oral Presentation/Seminar	(10%)

Prescribed text: D.A. Sleper and J.M. Poehlman (2006) Breeding field crops (Latest Ed). Blackwell Publishing

Rationale: Progress in agriculture in any country (small or large) depends upon the varieties developed by the plant breeders in the field of horticultural crops. The need to teach plant breeding in a MSc PPP arises from the importance of the plant breeding principles to plant production generally. This course is designed to give exposure to the students in the principles of plant breeding and the recent trends in the use of biotechnological tools in plant breeding efforts for the sustainable agricultural production system in the Caribbean. Students can start small/medium seed production enterprise in the Caribbean region.

BIOL6025 Principles of Phytopathology
3 credits Semester 1 Level: Graduate

Aim: To illustrate how plant diseases develop and spread and how they may be managed

Objectives: On successful completion of this course, students should be able to:

1. Explain how plant diseases develop
2. Explain how various factors promote plant disease development and spread
3. Describe the approaches that may be taken to manage plant diseases
4. Conduct field and laboratory exercises to investigate the development of plant diseases and evaluate the factors that influence disease development and spread

Course Content:

1. The history of plant pathology
2. Parasitism and disease development in plants
3. Effects of pathogens on plant physiological functions
4. Mechanisms used by pathogens to attack plants
5. Mechanisms used by plants to defend themselves against pathogen attack
6. Genetics of plant disease
7. Environmental effects on the development of infectious plant diseases
8. Plant disease epidemiology
9. Plant disease control (physical, chemical, biological, genetic and molecular)

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One 3-hour theory paper	50%
	Coursework	50%
	Field and laboratory reports (4 x 5%)	(20%)
	Plant disease collection	(20%)
	One 1-hour written test	(10%)

Prescribed Text: Agrios, G. N. 2005. *Plant Pathology*. Elsevier Academic Press, San Diego, California. ISBN: 0-12-044565-4

Recommended Text: Schumann, G. L. and D'Arcy, C. J. 2009. *Essential Plant Pathology*. American Phytopathological Society, St. Paul, Minnesota. ISBN: 13:978-089054-381-8

Rationale: Plant diseases contribute, significantly, to loss of crop yield before and after harvest. This course is designed to expose students to the principles that underlie the development and spread of plant diseases and also disease management. Students will gain an understanding of those features that are shared by diseases caused by different types of disease agents as well as those features that differ among the agents.

BIOL6026 Plant Diseases: Biology, Ecology and Management
(6 credits) Semester 1 Level: Graduate

Aims:

1. To demonstrate the symptoms of tropical plant diseases caused by specific agents.
2. To show how a knowledge of disease developmental cycles will lead to the selection of appropriate management strategies.

Objectives: On successful completion of this course, students should be able to:

1. Recognize the symptoms of various plant diseases
2. Manipulate the causal agents
3. Identify appropriate disease management strategies based on pathogen biology and ecology
4. Show competency in conducting practical exercises to diagnose the cause of a disease and to identify suitable management strategies

Pre-requisites: Bachelor of Science degree (Honours) in a EITHER a biological science degree OR an environmental or agricultural science degree with a strong biological component, or a suitable equivalent

Course Content:

1. Comparison of disease symptoms caused by biotic agents with disorders caused by abiotic agents
2. The biology and ecology of the major groups of plant pathogens, viz. fungi and related organisms, bacteria and related organisms, nematodes, viruses and viroids
3. Specific diseases of seeds, seedlings, roots, stems, leaves, flowers and fruits caused by the major groups of pathogens as well as by flagellate protozoa, and parasitic higher plants
4. Disease complexes
The interactive effects of simultaneous or consecutive infection by various pathogens

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	36 Hours
	Practical exercises	-	60 Hours
	Seminars/Tutorials	-	12 Hours

Evaluation:	One 3-hour theory paper	50%
	Coursework	50%
	Field and laboratory reports (4 x 5%)	(25%)
	Plant disease investigations	(15%)
	Two 1-hour written tests (2 x 5%)	(10%)

Prescribed Text: Agrios, G. N. 2005. *Plant Pathology*. Elsevier Academic Press, San Diego, California. ISBN: 0-12-044565-4

Recommended Text: Schumann, G. L. and D'Arcy, C. J. 2009. *Essential Plant Pathology*. American Phytopathological Society, St. Paul, Minnesota. ISBN: 13:978-089054-381-8

Rationale: Very few persons in Jamaica have a good understanding of plant diseases caused by infectious agents, the biology and ecology of these agents and how to use this knowledge to formulate disease management strategies. This course seeks to increase this knowledge in the Jamaican population and thereby promote the use of nonchemical means of plant disease control as well as the judicious use of pesticides.

BIOL6027 Applied Insect Biology
3 credits Semester 2 Level: Graduate

Aim: To equip students with knowledge of the morphology, physiology and systematics of insects.

Objectives: On successful completion of this course, students should be able to:

1. Relate the general morphology of major groups of insects to their classification and life style
2. Associate the sensory systems in insects with their behavior
3. Show competency in the classification of insects
4. Identify the orders and families to which different species of insects belong.

Syllabus:

1. Insect biodiversity
2. Insect systematics
3. The external and internal anatomy of insects
4. Sensory systems in insects
5. Insect reproduction
6. Insect development

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50%
	Coursework	50%
	Field and laboratory reports (4 x 5%)	(20%)
	Insect collection	(20%)
	Oral presentation	(10%)

Prescribed Text: Gullan, P. J. And Cranston, P. S. 2010. The Insects: An outline of Entomology. Wiley-Blackwell. ISBN: 978-1-443-3036-6

Rationale: Protecting plants from insect pests remains a major challenge to persons involved in plant production. The approach to resolving this challenge has focused more on efforts to control rather than manage the insect populations. While management is now the accepted approach, success continues to be limited primarily because those developing and implementing the management programmes have little knowledge of the organisms they are trying to manage. This course will provide participants with a comprehensive knowledge of insects, thus allowing them to make informed decisions in the development of appropriate management strategies for those insects that may attain pest status.

BIOL6028 Ecology and Management of Arthropod Pests of Plants
3 credits Semester 2 Level: Graduate

Aim: To equip students with the knowledge of ecological principles, and skills involved in ecological assessment and management of arthropods in relation to their acquired pest status.

Objectives: On successful completion of this course, students should be able to:

1. Determine the association between ecological principles and pest outbreaks
2. Identify arthropod pests and relate morphology to injury and damage
3. Assess damage and determine the economic status of arthropod pests affecting plants
4. Develop integrated pest management programmes for various plant production systems.

Syllabus:

1. Plant-production ecosystems
2. The ecology of arthropods associated with plants
3. Techniques for assessing the population, activity and economic impact of arthropod pests of plants
4. Determination of Economic Injury Levels and Action or Economic Thresholds
5. Pest control options
6. The principles of Integrated Pest Management (IMP)
7. The development of IMP programmes for different production systems
8. Ecological and environmental considerations in arthropod pest management

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50%
	Coursework	50%
	Field and laboratory reports (4 x 5%)	(25%)
	Oral presentations (2 x 5%)	(10%)
	In-course test	(15%)

Prescribed Text: Speight, M. R., Hunter, M. D. and Watt, A. D. 2008. Ecology of Insects: Concepts and Applications, 2nd Edition. Wiley-Blackwell. ISBN 978-1-4051-3114-8

Rationale: There is increasing pressure for persons and organizations involved in the production of plants to protect these plants utilizing methods that are sustainable with little or no risk to humans and the environment. For this to be achieved there needs to be an ecological approach towards the management of pests. Such an ecological approach requires a sound knowledge-base on the ecology of organisms that attain pest status and specialized skill sets that will allow the sustainable manipulation of the environment to maintain the population of pest organisms at an acceptable general equilibrium population. This course is designed to provide requisite knowledge and skills.

BIOL6029 Weed Biology, Ecology and Management
 3 credits Semester 2 Level: Graduate

Aims:

1. To understand the biology and ecology of weeds and weed communities in plant production systems.
2. To examine the principles of weed management practices and how they can be applied in Caribbean cropping systems in a holistic and sustainable way.

Objectives:

On successful completion of the course, the student should be able to:

1. Assess the effects of weeds in plant production systems
2. Explain the biological characteristics of weeds of cropping systems
3. Identify weed species common in Caribbean crops
4. Explain the principles and factors that shape weed community structure
5. Demonstrate and assess the dynamics of competition between weed and crop plants
6. Explain the principles of weed management practices
7. Evaluate the application of weed management practices in different cropping systems
8. Develop weed management strategies, that are compatible with other pest management strategies, for sustainable agroecosystems

Syllabus:

1. Weed as a concept; deleterious and beneficial effects of weeds;
2. Characteristic growth and reproduction of typical weeds in cropping systems;
3. Identification and collection of typical Jamaican weed species;
4. How weed species interact to form communities and how environmental and agronomic factors affect them; importance of the soil seed-bank;
5. Competition between weed and crop plants; the principles behind the minimisation of competition;
6. Management practices used to control weeds; examples for different types of Caribbean crops;
7. Managing weeds in sustainable systems with all other agronomic and pest management needs considered;
8. New weed problems and future challenges in weed management.

Practical exercises will be conducted on the above-mentioned topics.

Mode of Delivery:	Lectures	-	18 Hours
	Practical exercises	-	30 Hours
	Seminars/Tutorials	-	6 Hours

Evaluation:	One three-hour theory paper	50 %
	Coursework	50 %
	Field and laboratory reports (4 x 5%)	(20 %)
	Quiz	(15 %)
	Weed collection (30 species)	(15 %)

Prescribed Text: Kingely, R. V. 2009. Weeds: Management, Economic Impacts and Biology. Nova Science Publishers Inc. ISBN: 1607410109.

BIOL6110 **Research Project**
(9 credits) Semester 3 Level: Graduate

Aim: To plan and carry out a research project on a topic relevant to the MSc specialization.

Objectives: Upon successful completion of this course students will be able to:
1. Identify research needs within a chosen field
2. Plan and carry out a research project answering identified needs.

Syllabus: The research programme will be identified by a qualified supervisor.

Assessment Strategy

Oral Presentation of Research Project	25%
Research Paper	75%

Recommended reading:

Leedy, P.D. and J.E. Ormrod, 2007. 8th Ed. Practical research: planning & design. Prentice Hall College Division. ISBN 0139603603. US\$ 56.

Ling Pan, M. 2010. Preparing Literature Reviews: Qualitative and Quantitative Approaches

The module will demonstrate the concept of Unit of Analysis or Unit of Observation, types of sampling procedures and appropriate selection procedures leading to random or probability sampling as well as non-probability sampling and triangulation. Details of sample size, statistical estimations, sources of data and the differences between primary and secondary data will be explained and demonstrated.

A discussion on levels of measurement, parametric and non-parametric test will precede statistical significance tests including but not limited to Chi-square, Correlations. Linear Regression. Logistic Regression, Anova and Manova.

Mode of delivery:	Lectures	24 hours
	Tutorial/Seminar/Laboratory	24 hours

Assessment:

One type written dissertation (Research proposal & Literature review)	50%
Seminar (Oral presentation of research proposal & review)	20%
Coursework	30%
End of course test	15%
Written assignments	15%

Recommended reading:

Leedy, P.D. and J.E. Ormrod, 2005. 8th Ed. Practical research: planning & design. Pearson Educational International and Prentice Hall, New Jersey. ISBN 0139603603.

Van Wagenen, R. K. 1991. Writing a thesis: substance and style. Prentice Hall, Inc. ISBN 0-13-971086-8