

II YEAR	ENVIRONMENTAL SCIENCE	EVST301S
SEMESTER – III		HRS/WK – 3
AEC		CREDIT – 2

(For B.A., Tamil II Year Students)

Rw;Wr; #oy; mwptpay;

Unit/myF-1 Rw;Wr; #o;apay; kw;Wk; ,aw;if tsq;fs;

Rw;Wr; #oy; ,aypd; ,yf;fzk;> Nehf;fk;> Kf;fpaj;Jtk; - fhLk; mjd; tsq;fSk;> fhLfs; mopg;G> Ruq;fk;> ePH Njf;f miz – ePH Mjhuq;fs;> gad;ghLfs;> nts;sk;> twl;rp> fdpk tsq;fs; - Ruz;ly;>msthf vLj;jy; (k) gad;ghL czT tsq;fs; - czTk; mjd; epiw FiwfSk;> mjp jPtpu Nka;r;ry;> G+r;Rf;nfhy;yp (k) capHnfhy;ypapd; Fiwfs;> ePH Njq;Fjy;> cg;Gj;jd;ik> rf;jp tsq;fs; - rf;jpapd; Njitfs;> GJg;gpf;f \$ba (k) GJg;gpf;f ,ayhj rf;jpfs; epy tsq;fs; - epytsf; FiwT> epyr;rhpT> kz;rhpT kw;Wk; ghiytdkhFjy;> ,aw;if tsq;fspd; ghJfhg;G ed;ikfSk;.

Unit/myF-2 #oy;epiy kz;lyq;fs;

Nfhl;ghL> mikg;G kw;Wk; nray;ghL cw;gj;jpahsHfs;> EfHNthHfs; kw;Wk; rpijg;gtHfs; - #o;epiy kz;lyj;jpd; Mw;wy; Xl;lk; #opay; topKiw tsHr;rp>czTr;rq;fpyp> czTtis> #o;epiy kz;lyq;fs; tiffs;> jd;ikfs;> mikg;G kw;Wk; nray;ghL – fhL;L #o;epiy kz;lyk;> Gy;ntsp #o;epiy kz;lyk;> ghiytdk; kw;Wk; ePHr;#o;epiy kz;lyk;.

Unit/myF-3 caphpag; gy;tifik

tiuaiw> tiffs;> caphpag; gy;tifikapd; gad;fs;> ,e;jpah XH caphpakpif gy;tifik kz;lyk;> caphpakpif gy;tifik ,lq;fs;> caphpay; gy;tifikf;F mr;RWj;jy;> caphpa gy;tifikapd; ghJfhg;G.

Unit/myF-4 Rw;Wr;#oy; khRghL

fhw;W khRghL> ePH khRghL> kz; khRghL> fly; khRghL> ,iur;ry; khRghL> mdy; khRghL kw;Wk; fjphpaf;f khRghL – jplfopT Nkyhz;ik> fhuzpfs;> tpiTsfs;> jLf;Fk;Kiw kw;Wk; ghJfhg;ghd mg;Gwg;gLj;Jk; Kiw NghplH Nkyhz;ik> nts;sk;> epyeLf;fk;> Gay;> epyr;rhpT kw;Wk; Mopg;Nguiyfs;.

Unit/myF-5 r%f rpf;fy;fSk; kf;fs; ngUf;fKk; Rw;Wr;#oYk;

ePHts ghJfhg;G> kioePH Nrfhpg;G> ePHts Nkyhz;ik – Rw;Wr;#oy; tiuKiw rpf;fy;fSk; mjd; ePHf;Fk; fhuzpfSk;> thdpiy khw;wq;fs;> cyfntg;gkakhjy;> mkpykio> XNrhd; rpijT> fjphpaf;f tpgj;Jfs; kw;Wk; NghplHfs; ePHgphpif KfL rPuikg;G> Rw;Wr;#oy; ghJfhg;G rl;lk;> td caphpdg; ghJfhg;G rl;lk;> tdg;ghJfhg;G rl;lk;> #w;Wr;#oy; tpopg;GzHT> kf;fs; njhifg; ngUf;fk;>

Rw;Wr;#oy; (k) kdpj eyd; - kdpj eydpYk;> Rw;Wr; #oypYk; jfty; njhopy; El;gj;jpd; gq;F.

III B.Sc Zoology	ENVIRONMENTAL BIOLOGY	20ZO614
SEMESTER – VI		HRS/WK – 5
CORE – XII		CREDIT – 4

Objective:

1. To learn the scope of environmental biology, importance of protection and conservation of wild life to maintain the ecosystem balance.
2. To create awareness about the environmental problems and motivate the students to participate in environment protection and sustainable utilization of natural resources.

Course Outcomes (CO's):

On completion of the course students will be able

CO1: To realize the scope and concept of environmental biology

CO2: To describe structure and functions of ecosystem.

CO3: To understand biogeochemical cycles and animal association

CO4: To describe population and community of an ecosystem and management of natural resources

CO5: To get knowledge on environmental degradation and their effects and remedy measures

Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER VI	COURSE CODE: 20ZO614					COURSE TITLE: ENVIRONMENTAL BIOLOGY										HOURS: 5	CREDITS: 4
	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)											
COURSE OUTCOMES	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	5	5	5	5	4	5	5	3	1	4	3	1	5	5	5	4.1	
CO2	5	5	5	5	4	5	5	3	1	4	3	1	5	5	5	4.1	
CO3	5	5	4	5	4	5	5	5	1	4	3	1	5	5	5	4.1	
CO4	5	5	4	5	4	5	5	4	1	4	3	1	5	5	5	4.1	
CO5	5	5	4	5	4	5	5	3	1	4	3	1	5	5	5	4	
Mean Overall Score																4.1	

Result: The Score of this Course is 4.1 (Very High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
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Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **VERY HIGH** association with Programme Outcome and Programme Specific Outcome

UNIT – I

15 Hours

Scope – concept – Branches in ecology – Autecology, synecology - types of media and substratum and their influences on animals – **Water:** Properties, Forms of water, Soft and hard water. **Air** composition – properties. **Substratum:** Soil -Types, soil formation, soil group of India, soil profile.

UNIT – II

15 Hours

Biosphere – Hydrosphere – Lithosphere – Atmosphere – temperature: Distribution of temperature, thermal stratification – Temperature as a limiting factor, thermal adaptations. Light as a limiting factor. Ecosystem-concept, components, types, structure and functions.

UNIT – III

15 Hours

Biogeochemical cycles – gaseous cycle [C,N₂& S] sedimentary cycle, [phosphates]. **Animal association** - Intra specific and inter specific - colony formation, social organization, predation, parasitism, commensalisms, mutualism, inter specific competition – competitive principle or Gause's principle.

UNIT – IV

15 Hours

Population: Definition – characteristics – Natality, Mortality, age distribution of Population growth forms, population fluctuation. Community Ecotone and edge effects – ecological succession. Conservation - **Wild life management**, Preservation – laws enforced – sanctuaries, National parks. **Natural resources management:** renewable and non-renewable.

UNIT – V

15 Hours

Environmental degradation – deforestation, urbanization, population explosion and other environmental hazards – Environmental ethics and laws – Earth summits – role of governmental agencies for environmental monitoring.

Text Books:

1. Kotpal. R.L, and N.P. Bali, 1986. Concepts of Ecology, Vishal Publications, New Delhi-7
2. Rastogi V.B, and M.S. Jayaraji, 1988 – 1989 Animal Ecology and Distribution of animals, Kedarnath, Ram Nath Meerut – 250 001.

Reference Books:

1. Clark, G.L. 1954, Elements of Ecology, John Wiley & Sons Inc., New York, London.
2. Ananthakrishnan, T.N, and S. Viswanathan, Principles of Animal Ecology.
3. Eugene P. Odum, 1971. Fundamentals of ecology, Saunders International Student Edition, W.B. Saunders Company, Philadelphia London, Toronto.

4. Verma, P.S and Agarwal 1986, Environmental Biology, S. Chand & Co Ltd. New Delhi.

II B.Sc Zoology	BIOTECHNOLOGY	19ZO408
SEMESTER – IV		HRS/WK – 4
CORE – VIII		CREDIT – 3

Objective:

1. To generate potential knowledge regarding the scope and applications of biotechnology.
2. To understand the modern biotechnology practices and approaches with highlighting in genetic engineering , rDNA technology, cloning and gene transfer technology

Course Outcomes (CO's):

On completion of the course students will be able

CO1: To know the scope and applications of biotechnology

CO2: To acquire knowledge on techniques of genetic engineering and rDNA technology.

CO3: To realise gene cloning in prokaryotes and basics of human genome project.

CO4: To describe transgenic plants and animals

CO5: To understand the application of recombinant DNA technology

Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER IV	COURSE CODE: 19ZO408					COURSE TITLE: BIOTECHNOLOGY										HOUR S: 4	CRED ITS:3
	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)											
COURSE OUTCOMES	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	5	5	5	5	4	3	5	1	3	4	4	3	4	3	5	4.0	
CO2	5	5	5	5	4	3	5	2	3	4	4	4	4	4	5	4.1	
CO3	5	5	4	5	4	3	5	2	4	4	4	4	4	4	5	4.1	
CO4	5	5	5	5	4	3	5	2	4	4	4	4	4	4	5	4.2	
CO5	5	5	5	5	4	3	5	2	4	4	4	4	4	3	5	4.1	
Mean Overall Score																4.1	

Result: The Score of this Course is 4.1 (Very High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **VERY HIGH** association with Programme Outcome and Programme Specific Outcome

UNIT – I

12Hours

Definition – Scope and applications of Biotechnology – isolation of DNA – types of DNA extraction methods – cloning – Tools of Genetic Engineering: Enzymes, Linkers and Adaptors.

UNIT-II

12Hours

Cloning vectors: requirements of a cloning vector, types [plasmids, pBr322, Phage I, Cosmids and phagemids]. Techniques of Genetic Engineering - recombinant DNA Technology.

UNIT-III

12Hours

Gene Cloning in prokaryotes, **cDNA- Genomic Library**, construction and uses. Human genome project: Genome and its significance, techniques of Human Genome Project, Potential benefits of Human genome projects .

UNIT – IV

12Hours

Transgenic plants and animals – Production of Transgenic plant (Bt. Cotton) and transgenic animal (mice), Applications of Transgenic animals. .DNA finger printing and its applications– gene therapy – biosensors and its applications – biochips and its applications

UNIT-V

12Hours

Application of Recombinant DNA technology in Medicine and Agriculture – Application of biotechnology in environmental protection – Socio economic issues of Biotechnology in India

Text Books:

1. Dubey, R.C 2006 Text Book of Biotechnology S. Chand & co. New Delhi.
2. Kumar H. D. 1998 A text book of Biotechnology, affiliated East West pvt. Ltd., New Delhi.

Reference Books:

1. Higgins II, Best GJ and Jones J 1996 Biotechnology – Principles and application Black well scientific Publication Oxford London.
2. Gupta, P.K. 2001 Elements of Biotechnology Rastogi publication, Meerut.
3. Vijayaraman, Chellammal K.S and Manikkili. P 1998. UyiriyaeThozhilnutpam. Chimeeraa, Trichy.

III B.Sc Zoology	APPLIED ENTOMOLOGY	20EZ512A
SEMESTER – V		HRS/WK – 5
ELECTIVE-I (Compulsory)		CREDIT – 4

Objective:

1. To provide extensive knowledge in the field of Entomology.
2. The familiarity between insect and environment was highlighted to the entomological research in many directions which have immense value in the control measures various disease causing insects.

Course Outcomes (CO's):

On completion of the course students will be able

CO1: To describe the economic classification of insects

CO2: To understand the types of insect development

CO3: To know pests of stored products and their control

CO4: To describe pest control methods and application

CO5: To understand the production and marketing of pesticides

Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER V	COURSE CODE: 20EZ512A					COURSE TITLE: ELECTIVE-I APPLIED ENTOMOLOGY										HOURS: 5	CRE DITS :4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	5	5	4	5	4	4	4	5	2	2	3	2	5	4	5	4.0	
CO2	5	5	4	5	3	4	4	4	3	2	3	2	5	3	5	3.8	
CO3	5	5	4	5	4	4	4	3	2	2	3	2	5	5	5	3.9	
CO4	5	5	4	5	5	4	4	3	1	3	3	2	5	5	5	4.0	
CO5	5	5	5	5	5	4	4	2	1	3	3	2	5	5	5	4.0	
Mean Overall Score															3.9		

Result: The Score of this Course is 3.9 (High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5

Rating	Very Poor	Poor	Moderate	High	Very High
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This Course is having **HIGH** association with Programme Outcome and Programme Specific Outcome

UNIT – I **15 Hours**

INTRODUCTION – economic classification of insects - Types of pests – types of damage caused by pests in crops – causes for insects assuming pest status – outbreak of pests.

UNIT – II **15 Hours**

TYPES OF INSECT DEVELOPMENT – ametabola and metabola (hemi metabola, holometabola, paurometabola and hypermetabola) - Pests of agricultural importance, their bionomics, life cycle and control measures of paddy, ground nut, cotton, tomato, coffee & Banana.

UNIT – III **15 Hours**

PESTS OF STORED PRODUCTS AND THEIR CONTROL – Household pests – cockroach and termites – and their control – pest in relation to public health – rodents and their control. Mosquitoe borne diseases and their control measures.

UNIT- IV **15 Hours**

PEST CONTROL METHODS AND APPLICATION: cultural, mechanical, biological and chemical methods – classification of pesticides – LC 50 and LD 50 values – First Aid & precautions in handling pesticides – pesticide spraying appliances. Residual effects of pesticides on non target organisms.

UNIT – V **15 Hours**

PESTICIDE INDUSTRY - production and marketing – recent trends in pest control – pheromones, attractants, repellants and chemosterilants Integrated pest management, its importance & applications.

Text Books:

1. Vasantharaj David and T. Kumaraswami 1988. Elements of Economic Entomology Popular Book Depot, Chennai.
2. Nayar, K.K., Ananthakrishnan, T.N. and B.V. David 1992 General and Applied Entomology Tata McGraw, New Delhi.
3. P.G. Fenemore and Alka Prakash 1997 Allied Entomology, Wiley Eastern Ltd., New York

Reference Books:

1. Wigglesworth J.B., 1994. Insect Physiology, Chapman and Hall, London.
2. Temphare D.B., 1984 A. Text Book of Insects Morphology, Physiology and Endocrinology. S. Chand and Co., New Delhi.
3. A.Upadhyaya, K.Upathyaya and N.Nath, 2003 Biophysical chemistry, Principles and Techniques,3rd Ed, Himamalaya publishing house.

4. H.B.Bull, F.H.Davis, 1971. An introduction to physical Biochemistry 2nd Ed, Philadelphia
5. Gurumani.N 2006. Research methodology for biological sciences MJP publ. Chennai.

III B.Sc Zoology	ELECTIVE – II PUBLIC HEALTH AND HYGIENE	20EZ513B
SEMESTER – VI		HRS/WK – 4
ELECTIVE –II (Optional)		CREDIT – 3

Objective:

1. To impart awareness on Public Health and Hygiene
2. To create knowledge on Health Education.

Course Outcomes (CO's):

On completion of the course students will be able

CO1: To understand public health and hygiene

CO2: To realize environment and health hazards

CO3: To understand the communicable diseases and their control measures.

CO4: To understand the non-communicable diseases and their control measures

CO5: To know the health education in India

Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER VI	COURSE CODE: 20EZ513B					COURSE TITLE: ELECTIVE - II PUBLIC HEALTH AND HYGIENE										HOURS:4	CREDITS:3
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	5	5	2	3	3	5	5	3	2	4	2	3	5	3	5	3.7	
CO2	5	5	2	3	3	5	5	3	2	4	2	3	5	3	5	3.7	
CO3	5	5	4	3	3	5	5	3	2	4	2	3	5	3	5	3.8	
CO4	5	5	4	3	3	5	5	3	2	4	2	3	5	3	5	3.8	
CO5	5	5	4	3	3	5	5	3	2	4	2	3	5	3	5	3.8	
Mean Overall Score															3.8		

Result: The Score of this Course is 3.8 (High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5

Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **HIGH** association with Programme Outcome and Programme Specific Outcome

UNIT-I

12Hours

Scope of Public health and Hygiene – nutrition and health – classification of foods – Nutritional deficiencies - Vitamin deficiencies.

UNIT-II

12Hours

Environment and Health hazards – Environmental degradation – Pollution and associated health hazards.

UNIT-III

12Hours

Communicable diseases and their control measures such as Measles, Polio, Chikungunya, Rabies, Plauge, Leprosy and AIDS.

UNIT-IV

12Hours

Non-Communicable diseases and their preventive measures such as Hypertension, Coronary Heart diseases, Stroke, Diabetes, Obesity and Mental ill-health.

UNIT-V

12Hours

Health Education in India – WHO Programmes – Government and Voluntary Organizations and their health services – Precautions, First Aid and awareness on sporadic diseases.

Text Books:

1. Park and Park, 1995: Text Book of Preventive and Social Medicine – Banarsidas Bhanot Publ. Jodhpur – India.
2. Dubey, R.C and Maheswari, D.K. 2007 : Text Book of Microbiology – S. Chand & Co. Publ. New Delhi – India.

Reference Books:

1. Verma, S. 1998 : Medical Zoology, Rastogi publ. – Meerut – India
2. Singh, H.S. and Rastogi, P. 2009 : Parasitology, Rastogi Publ. India

II B.Sc (Microbiology)	APPLIED ENTOMOLOGY	19AZMB42
SEMESTER – IV		HRS/WK – 5
ALLIED		CREDIT – 4

Objective:

1. To provide extensive knowledge in the field of applied entomology.
2. The familiarity between insect and environment was highlighted to various field like agricultural entomology, medical entomology and industrial entomology

Course Outcomes (CO's):

On completion of the course students will be able

CO1: To obtain knowledge on basic introduction of entomology

CO2: To recognize beneficial and harmful insects in the agricultural entomology

CO3: To describe vector borne diseases, control measures and awareness in medical entomology

CO4: To identify productive insects in industrial entomology

CO5: To understand pest control methods and application

Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER IV	COURSE CODE: 19AZMB42					COURSE TITLE: APPLIED ENTOMOLOGY										HOUR S: 5	CRED ITS:4
	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)											
COURSE OUTCOMES	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	5	5	5	5	5	5	5	3	2	4	4	2	5	1	5	4.1	
CO2	5	5	5	5	5	4	5	5	2	4	4	2	5	2	5	4.2	
CO3	5	5	5	5	5	4	5	5	2	4	4	2	5	3	5	4.3	
CO4	5	5	5	5	5	4	5	5	3	4	4	2	5	3	5	4.3	
CO5	5	5	5	5	5	4	5	4	2	4	4	2	5	3	5	4.2	
Mean Overall Score																4.2	

Result: The Score of this Course is 4.2 (Very High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **VERY HIGH** association with Programme Outcome and Programme Specific Outcome

UNIT – I

15 Hours

INTRODUCTION TO ENTOMOLOGY

Definition – classification upto orders - scope- Agricultural entomology, Forest entomology, Veterinary entomology, Medical entomology, Forensic entomology, Industrial entomology.

UNIT – II

15 Hours

AGRICULTURAL ENTOMOLOGY

Pest identification marks, nature, symptoms of damage. Any two pests - rice, Maize, pulses, sugar cane, cotton, coconut, ground nut, brinjal.

Pollinators, Destroyers of insect pests, Serve as food, Destroyers of weeds, Improve soil fertility.

UNIT – III

15 Hours

MEDICAL ENTOMOLOGY

Life cycles of arthropod vectors - ticks, mites and fleas. Vector borne diseases: malaria, filariasis, dengue. Vector control- Chemical, Biological, Genetic and Environmental. Insecticide resistance in vectors. Drug resistance in pathogens. Importance of education, awareness and Community participation.

UNIT – IV

15 Hours

INDUSTRIAL ENTOMOLOGY

Productive Insects (a) Honey bee: Apiculture and its scope; life history, Bee products- Honey and Bee wax, and Uses, Bee diseases. (b) Silk moth: Different types of silkworms, life cycle; Sericulture, uses of silk, silk worm diseases. (c) Lac insect: Different strains of Lac insects, uses of lac.

UNIT – V

15 Hours

PEST CONTROL METHODS AND APPLICATION:

Cultural, mechanical, biological and chemical methods – classification of pesticides. First Aid & precautions in handling pesticides – pesticide spraying appliances. Residual effects of pesticides on non target organisms. Pesticide industry- production and marketing – Integrated pest management, its importance & applications.

Text Books:

1. Vasantharaj David and T. Kumaraswami 1988. Elements of Economic Entomology Popular Book Depot, Chennai.
2. Nayar, K.K., Ananthkrishnan, T.N. and B.V. David 1992 General and Applied Entomology Tata McGraw, New Delhi.

Reference Books:

1. P.G. Fenemore and AlkaPrakash 1997 Allied Entomology, Wiley Eastern Ltd., New York.
2. Wigglesworth J.B., 1994. Insect Physiology, Chapman and Hall, London.
3. Temphare D.B., 1984 A. Text Book of Insects Morphology, Physiology and Endocrinology. S. Chand and Co., New Delhi.
4. A.Upadhyaya, K.Upathyaya and N.Nath, 2003 Biophysical chemistry, Principles and Techniques,3rd Ed, Himamalaya publishing house.
5. H.B.Bull, F.H.Davis, 1971. An introduction to physical Biochemistry 2nd Ed, Philadelphia
6. Gurumani.N 2006. Research methodology for biological sciences MJP publ. Chennai.