



**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Zoology

Programme Name : B. Sc

Academic Year : 2021-22

List of Courses Focus on Employability/ Entrepreneurship/Skill

Sr. No.	Course Code	Name of the Course
01.	AEC-1	Human Health and Sex Education
02.	SEC-1	Aquaculture
03.	SEC-2	Sericulture

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Scheme and Syllabus

B.Sc. Hon's (Zoology): LOCF 2021-2022
Department of Zoology, School of Life Sciences

Course Opted	Course Code	Name of the course	Credit	Hour/ week	Internal Assess	End Sem Exam
Semester I						
CC-1 Theory	ZOUATT1	Systematics and Diversity of Life- Protists to Chordates	3	3	30	70
CC-1 Practical	ZOUATL1	Lab Course	2	4	30	70
CC-2 Theory	ZOUATT2	Developmental Biology and Evolution	3	3	30	70
CC-2 Practical	ZOUALT2	Lab Course	2	4	30	70
GEC-1 Theory	ZOUATG1	Exploring the Brain: Structure and Function	3	3	30	70
GEC-1 Practical	ZOUALG1	Lab Course	2	4	30	70
AEC-1 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-1 Practical		To be drawn from the pool of AEC	1	2	30	70
SEC-1 Theory		To be drawn from the pool of SEC	1	1	30	70
SEC-1 Practical		To be drawn from the pool of SEC	1	2	30	70
		Additional Credit Course				
TOTAL			19	27	300	700
Semester II						
CC-3 Theory	ZOUBTT1	Comparative Anatomy and Physiology of Non Chordates	3	3	30	70
CC-3 Practical	ZOUBLT1	Lab Course	2	4	30	70
CC-4 Theory	ZOUBTT2	Cell Biology and Histology	3	3	30	70
CC-4 Practical	ZOUBLT2	Lab Course	2	4	30	70
GEC-2 Theory	ZOUBTG1	Vectors, Diseases and Management	3	3	30	70
GEC-2 Practical	ZOUBLG1	Lab Course	2	4	30	70
AEC-2 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-2 Practical		To be drawn from the pool of AEC	1	2	30	70
SEC-2 Theory		To be drawn from the pool of SEC	1	1	30	70
SEC-2 Practical		To be drawn from the pool of SEC	1	2	30	70
		Additional Credit Course				
Total			19	27	300	700
Semester III						
CC-5 Theory	ZOUCTT1	Comparative Anatomy and Physiology of Chordates	3	3	30	70
CC-5 Practical	ZOUCTL1	Lab Course	2	4	30	70
CC-6 Theory	ZOUCTT2	Genetics	3	3	30	70
CC-6 Practical	ZOUCTL2	Lab Course	2	4	30	70
CC-7 Theory	ZOUCTT3	Biochemistry	3	3	30	70
CC-7 Practical	ZOUCTL3	Lab Course	2	4	30	70
GEC-3 Theory	ZOUCTG1	Food, Nutrition and Health	3	3	30	70
GEC-3 Practical	ZOUCTL1	Lab Course	2	4	30	70
AEC-3 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-3 Practical		To be drawn from the pool of AEC	1	2	30	70
		Additional Credit Course				
Total			22	31	300	700
Semester IV						
CC-8 Theory	ZOUBTT1	Behaviour and Chronobiology	3	3	30	70
CC-8 Practical	ZOUBLT1	Lab Course	2	4	30	70
CC-9 Theory	ZOUBTT2	Ecology	3	3	30	70
CC-9 Practical	ZOUBLT2	Lab Course	2	4	30	70
CC-10 Theory	ZOUBTT3	Molecular Biology	3	3	30	70
CC-10 Practical	ZOUBLT3	Lab Course	2	4	30	70
GEC-4 Theory	ZOUBTG1	Global Environmental Issues	3	3	30	70
GEC-4 Practical	ZOUBLG1	Lab Course	2	4	30	70
AEC-4 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-4 Practical		To be drawn from the pool of AEC	1	2	30	70
		Additional Credit Course				
TOTAL			22	31	300	700
		Summer Internship*	6	90*	30	70

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Ability Enhancement Course (AEC): AI

Semester	Core Course	Course Title	Credits
I-V	AEC-I	Human Health and Sex Education	Theory: 01, Practical: 01

About the course

The course is designed to address problems associated with health and sex thereby, promoting fitness and well being.

Learning outcomes

After the completion of this course, the students will be able to:

- understand the importance of good health.
- observe clean sexual habits thereby warding off sexually transmitted diseases.

Theory

Unit I: Health: Physical and spiritual

Health as a state of wellbeing, health awareness, Physical health, immunization and vaccination, healthy food, balanced diet, food supplements, proper sleep, exercise and keeping away from stress, pathogens and pollution. Reproductive health, adolescence, senescence. Prevention from mental illness and disabilities, alcoholism, tobacco addiction, de-addiction, lifestyle diseases. Spiritual health, yoga and meditation.

Unit II: Human reproductive and developmental cycle

Human reproductive system: structural details of male reproductive system, semen, hormonal control. Female reproductive system- structure of ovary, puberty, reproductive cycles and hormonal control, gestation period, hysterectomy, menopause. Events of human reproduction: Gametogenesis- spermatogenesis and oogenesis, ovulation, fertilization, embryonic development, parturition.

Unit III: Infertility and assisted reproductive techniques

Human intervention in reproduction: Contraception and birth control-barrier method, hormonal methods, natural methods, sterilization, termination of pregnancy. Infertility-male and female infertility, causes and treatment for infertility. Advanced Reproductive Technologies- IVF, GIFT, ZIFT, Donor Insemination (DI), Sperm transfer techniques, Surrogacy.

Unit IV: Sex education and prevention from Sexually transmitted diseases

Sexually transmitted diseases: Syphilis, chlamydia, trichomoniasis, gonorrhoea, AIDS, Sex education: Adolescent sexual activity, teenage pregnancy, sexual harassment, sexual awareness and policies (legal aspects), lesbian and gay sex, bisexual, transgender youth, adolescent stress management

Recommended readings

1. Kothari P. (1994) Common sexual problems and solutions by, LIBS Publishers and Distributors Ltd.
2. Hadley, Mac. E., (2004) Endocrinology, (5th edition) Pearson Education, Singapore.
3. Taylor, D.J., Green, N.P.O., Stout G. W. (2005) Biological Science, (Editor R. Soper) 3rd Edition, Cambridge University Press.
4. The Complete Manual of Fitness and Well-being. The Reader's Digest Association, Inc. Pleasantville, New York / Montreal.
5. Guyton, A.C. and Hall, J.E., Textbook of Medical Physiology.

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Skill Enhancement Course (SEC): L1

Semester	Core Course	Course Title	Credits
I-II	SEC-I	Aquaculture	Theory: 01, Practical: 01

About the course

This course will give the students an understanding of the principles of aquaculture, including production systems, water quality, nutrition, spawning, larval culture and culture methodologies with special reference to fish, and prawn. The course will include an opportunity to conduct hands-on activities related to culture and husbandry of animals.

Learning outcomes

- After completing this course the learners will be able to
- .. Understand the aquaculture systems
 - .. Understand conditioning factors and how they can be manipulated
 - .. Describe water deputation mechanisms
 - .. Understand the environmental impacts of aquaculture

Theory

Unit I: Freshwater aquaculture systems

Aquaculture concept, Culture systems: Freshwater prawn culture, fish culture in paddy fields, Brackish water culture, Mariculture: Oyster culture, Crab culture, Lobster culture, mussel culture, culture of Eels, Culture of aquatic weeds. Composite fish culture: Definition and various patterns, Mixed fish farming in India. Techniques of composite culture. Culture of buffalo fish ..Culture of Catfishes. Culture of miscellaneous fishes. Cray fish culture.

Unit II: Preparation and management of fish culture ponds

Nursery ponds. Predatory and Weed fishes and their control, Fish toxicants, Fertilization. Aquatic insects and their control. Fish food organisms and their production. Supplementary feeding. Transport of fish seed and Brood fish. Causes of mortality in transport. Methods for packaging and transport. Open systems. Closed systems. Use of chemicals in live fish transport. Anesthetic drugs. Antiseptics and Antibiotics.

Unit III: Fish pathology

Parasitic infections, Fungus infections, Protozoan diseases, soryodata; Worm diseases. Non parasitic diseases. Rearing ponds, Stocking ponds. Fish breeding: Natural and artificial. Harvesting: Fishing techniques, preservation & processing of fish, Fresh water prawn culture, Introduction. Breeding characteristics. Juvenile prawn migration. Seasonal & regional distribution of seeds. Identification of juveniles. Controlled breeding. Culture: Ponds, Monoculture, Mixed culture.

Unit IV: Technologies in Fisheries development

Role of hard water in culture of Macrobrachium species. Fertilization & feeds. Pearl culture: Introduction, Pearl producing mollusks, pearl formation, collection of oysters, Rearing of oysters, insertion of nucleus, harvesting of pearls, composition & quality of pearl. Recirculation technology, Geographic Information System (GIS) technology, passive Acoustics in fisheries, Use of Information Communication Technology (ICT) in fishes: production aspects, marketing aspects.

Recommended readings

1. Jingran, V. G. (1983) Fish and fisheries of India, Hindustan pub. corp. New Delhi.
2. Hite, M. and Kaha, H. (2000) Textbook of fish culture, Blackwell Scientific Publication, Australia.
3. Srinivasulu, M., Reddy, K.R.S., Rao, S. (1999) Text book of Aquaculture, Discovery Publishing House New Delhi.
4. Yawn Mehta, Fisheries & Aquaculture Biotechnology (2011) Campus Books International, Prahalad street, Ansari Road, Durga Ganj, New Delhi.

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Skill Enhancement Course (SEC): L2

Semester	Core Course	Course Title	Credits
I-II	SEC-II	Sericulture	Theory: 01, Practical: 01

About the course

The course gives insight into the principles of sustainable sericulture and how these principles can guide your silkworm rearing into an enduring practice. The students will know about the laws and by laws governing keeping silkworm.

Learning outcomes

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

- Generation of skilled man power in the field of sericulture,
- To impart training in extension management and transfer of technology,
- To impart training in Post Cocoon Technology, and
- To provide field exposure

Theory

Unit I: Silkworm distribution and races

The silkworms. Its morphological characteristics. Distribution and types of races. Exotic and indigenous races of silkworm. World silk production World map and silk road, spread of Sericulture to Europe, South Korea, Japan, India and other countries. Sericultural practices in tropical and temperate climate.

Unit II: Biology of silkworm

Mulberry and non-mulberry Sericulture. Biology of silkworms. Selection of mulberry variety and establishment of mulberry garden. Rearing house and rearing appliances. Silkworm rearing technology: Early age and Late age rearing Selection of silkworm races/breeds for rearing. Incubation- definition, requirement of environmental conditions, incubation devices; identification of stages of development; black boxing and its importance.

Unit III: Diseases of silk worm and prevention and control

Diseases of silkworm, Disinfectants: Formalin, bleaching powder RKO. Types of mountages, Spinning, harvesting and storage of cocoons. Introduction; classification of silkworm diseases. Protozoan disease: symptomatology due to Nosema bombycis infection, source, mode of infection and transmission, cross infectivity, prevention and control. Bacterial, Viral, Fungal diseases: causative agents, symptoms, transmission prevention and control.

Unit IV: Prospects of Sericulture in India

Sericulture Types- natural and synthetic fibres- types of silk produced in India; Importance of mulberry silk. Silk industry in different states, employment, potential in mulberry and nonmulberry sericulture. Employment generation in sericulture: Role of women in sericulture. Sericultural practices in rain-fed and irrigated conditions; traditional and non-traditional areas. Sericulture organization in India; role of state departments of Sericulture, Central Silk Board, Universities and NGOs in Sericulture development .

Recommended readings

1. Manual on sericulture (1976). Rome : Food and Agriculture Organization of the United Nations, Agricultural Services Division.
2. Ulal, S.R. and , Narasimhanna, M.N. (1987) Handbook of Practical Sericulture: CSB, Bangalore
3. Silkworm Rearing and Disease of Silkworm (1956) Pd. By Director of Ptg., Sm. & Pub. Govt. Press, Bangalore
4. Jelly, M. S. (1986) Appropriate Sericultural Techniques; Ed., Director, CSR & TI, Mysore.
5. Handbook of Silkworm Rearing: Agriculture and Technical Manual-1 (1972) Fuzi Pub. Co. Ltd., Tokyo, Japan.
6. Narasimhanna, M. N. (1988) Manual of Silkworm Egg Production; CSB, Bangalore.
7. Sengupta, K. (1989) A Guide for Bivoltine Sericulture. CSR & TI, Mysore.

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