

INFORMATION OF ELECTIVE PAPER III IN VARIOUS SCIENCE SUBJECTS IN SYBSc.

Department of Physics

The science of Physics has diversified immensely in recent times and numerous new fields in Physics, such as Biophysics, Geo-Physics, Radio-Physics, Physics of metals and materials, etc. have come into existence. The fundamentals and the generality of many principles of Physics are common to all these specialized diverse fields. Most problems in applied areas have been discussed intensely in academic conferences and journals, but have not found their place in curricula or in text books. The new revised syllabus has been revamped to accommodate the changes in recent times and three fields have found their way into the revised syllabus.

SEM III

1. Acoustics, Lasers and Fiber Optics

This deals with acoustics of auditoriums etc., importance of laser in the modern world and its various applications in industry and optical communication technology which forms the backbone of current communication technology.

2. Biophysics

Biophysics or biological physics is an interdisciplinary science that applies the approaches and methods of physics to study biological systems. Biophysics covers all scales of biological organization, from molecular to organismic and populations. Biophysical research shares significant overlap with biochemistry, physical chemistry, nanotechnology, bioengineering, computational biology, biomechanics and systems biology.

3. Material Physics

With the advent and advancement in the field of nanotechnology it is essential to include the physics of materials in any course of Physics and this has been incorporated in the syllabus and introduces students to some techniques of making nanoparticles, science of various materials like LED's, OLED's, AMOLED's etc.

SEM IV

1. Geophysics

Geophysics is a subject of natural science concerned with the physical processes and physical properties of the Earth and its surrounding space environment, and the use of quantitative methods for their analysis. The term geophysics sometimes refers only to the geological applications: Earth's shape; its gravitational and magnetic fields; its internal structure and composition; its dynamics and their surface expression in plate tectonics, the generation of magmas, volcanism and rock formation and hence has been incorporated into the syllabus.

2. Microprocessors

This has been incorporated to introduce students to low level programming especially assembly language programming of 8085 microprocessors, its architecture, instruction set and few basic programs.

3. Health Physics and Radio Communication

This introduces students to science of X-rays, MRI scans etc. which plays an important role in modern diagnostic medicine as well as modern radio communication which plays a pivotal role in society today.

DEPT OF MICROBIOLOGY

Semester 3 Paper USMB303 Option A

Scope	Introduction To Clinical Microbiology This paper is focused on basics of Clinical Microbiology
Content	Three units of the paper are: Basic Microbiology Common infectious diseases, Epidemiology and public health awareness Control of Microorganisms & Safety in Clinical Microbiology
Benefits to the student	First unit on basic microbiology , familiarizes the students with basics of Microbiology, which helps them learn about the types of microorganisms, their classification, and the methods to observe them under microscope and to cultivate them under aerobic and anaerobic conditions. In the second unit, students are familiarized with common pathogens causing infections and basics of immunity to fight these infections Finally, in the third unit different methods of controlling the microbes , particularly from the clinical and hospital perspective and safe handling of pathogens in a clinical laboratory is taught.
Employment Prospects	Students who are interested in Medical Microbiology, keen to join a pathological lab or hospital get comprehensive knowledge and training giving them an edge over general microbiology students. Additionally, students who wish to go for PG or research program in medical microbiology will find it easy while appearing for entrance tests and interviews

Semester 4 USMB 403 Option A (2 credits , 45 lecture periods)

This is the age to acquire more interdisciplinary knowledge because it improves your perspective and outlook towards life and the opportunities that you get on a job. The semester 4 option on " Fermented foods, food sanitation and Microbial ecology" is a paper offering Applied Microbiology

In unit 1 on Food Fermentation The use of microorganisms in making of bread, wine, yoghurt etc implies the importance of fermentation processes. Perhaps somebody may turn it into an entrepreneurial venture. The market is witnessing inflow of newer probiotic based foods, a novel way of maintaining health by improving the immune system. Thus the use of probiotics in foods is introduced in this paper.

In Unit 2 on Food sanitation, the journey of food from farm to fork as it passes through many hurdles and meets all kinds of contaminants, right from insects, rodents, chemicals, toxins, microorganisms and adulterants is dealt with and the means to avoid them during processing and holding. The inclusion of food laws and consumer guidance appraises the students of how grievances can be addressed and whom they should approach.

In unit 3 on Microbial evolution and ecology, Environment, is being investigated through different ecosystems, like soil, water, marine plant etc. The influence of organisms and their benefits in manipulating or changing the ecosystem is dealt with. Again a thought process into composting from soil and marine environments is taken as an application venture.

All-in all therefore through basic knowledge the foundation in three different verticals is disbursed. The student through his interest and motivation can aspire to either take up a food auditor /QC job or summer training program in food and environment or any biological science related areas of expertise as the scope is opens up avenues for jobs as a biochemist, QC in food, Environmental monitoring etc.

DEPARTMENT OF STATISTICS

Statistics Paper 3 : Operations Research

Students, who have secured admission to S.Y.B.Sc. in Bhavan's College are aware that they have to offer Course III under “**Choice-Based Credits and Grading System (CBCS)**”. They can offer this course, if they wish to do so, from any other subject(s) other than the subjects they have offered.

The course “**Operations Research**” (**Statistics III**) is being taught by the teachers of Department of Statistics for past 33 years.

Its salient features are as under :

- Optimization techniques taught using algorithms (i.e. step by step approach in problem solving)
- 70:30 blend of problem solving and theory.
- Exposure to Industry Applications.
- No in depth mathematical treatment.
- Application oriented nature of the subject would add value in student's profile

The students having flair for number crunching would be natural choice to offer this course. The background knowledge of basic ideas in the subject is appreciated.

The only prerequisite is that the students must have passed XII standard with Mathematics as one of their subjects.

For further details, contact any teacher from Department of Statistics (1st Floor, Chemistry Building) between 10.00a.m. to 11.00a.m. during working days.

S.Y.B.Sc. Zoology - Elective Paper (2017-18)

Elective papers in the subject of Zoology for Sem III and IV have units which are interesting for even non-zoology students and topics which will be useful for them for their entire life. Thus, course code USZO303 – COURSE – 7 (Sem III – Paper 3) has three units titled Amazing animals, Ethology and Conservation biology, Applied Zoology and course USZO403 COURSE – 10 (Sem IV – Paper 3) has three units titled Holistic Health, Neurological and genetic diseases and Pollution.

COURSE – 7 (Sem III – Paper 3)

Unit: 1 Amazing animals

This unit deals with topics such as Natural History, The world's most amazing animals, Five most incredible animals discovered within the last decade and Marvels of Animals.



Unit: 2 Ethology and Conservation Biology

This unit deals with topics such as Ethology (Animal Behaviour)- introduction and types, animal communication, conservation biology and community conservancies.



Unit: 3 Applied Zoology

This unit deals with topics such as Vermiculture and Vermicomposting, Dairy science, Milk and milk products, Care of Pet animals like ornamental fish, breeds of dogs and cats.



COURSE – 10 (Sem IV – Paper 3)

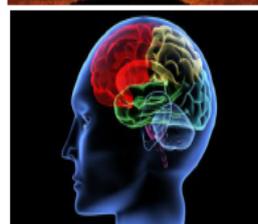
Unit 1: Holistic Health

This unit deals with topics such as lifestyle and health, role of diet to prevent chronic diseases, stress and health and addiction and health.



UNIT 2: Neurological and Genetic diseases

This unit deals with topics such as common neurological disorders, genetic disorders and genetic counseling.



Unit 3 : Pollution

This unit deals with topics such as introduction, causes, effects and control measures and interesting case studies related to pollution.



SYBSc :MATHEMATICS paper III

(Introduction to computing and problem solving)

In the elective course Mathematics paper III there are three units in each semester during the year.

SEM III

Unit I Algorithms

Unit : II Graphs and The shortest path algorithms.

Unit: III Trees and Tree traversal algorithms. and

SEM IV:

Unit I : problem solving Strategies

Unit II: Python programming language.

Unit III: Iteration, Strings and file Handling in Python.

Dear students, In this course you are exposed to how to write Pseudo code of any given Mathematical problem and pseudo code means a procedure to solve the problem stepwise using logic. You will be trained to write the problem in schematic diagram called ,graph and focus mainly on the problems which can be structured in the tree graphs ,once you are good in algorithms taught in the semester III the same problems can be solved using Python programming Language in the fourth semester. i.e You will be trained in writing and solving the problems using Python programming Languages.

Python programming language named after Monty Python in late 1980's is most useful to all-purpose programming . Python Programming is very easy as compare to C programming and java programming as it requires 30 -40 %less coding than c and java programming. Programming can be useful in solving the problems in Bioinformatics too. So, Dept of mathematics invites you, to choose mathematics paper III. at SYBSc.

BOTANY

SEMESTER-III

Unit1: Pharmacognosy and phytochemistry

This unit is helpful for all those people who are interested in learning about Ayurveda medicines, its preparation, and common adulterants and how to differentiate between the genuine and pseudo medicine. Very good chance for chemistry students to learn about medicinal plants.

Unit 2: Forestry and Economic Botany

This unit helps in the understanding the forest and forest types of India, use of urban forestry and inorganic farming. Economic botany helps in understanding the economic utilization of plants. Great opportunity for those students who wants to opt for Forestry as optional subject in UPSC.

Unit 3: Industry based on plant products

This unit helps in how plant can be exploited for industrial utilization. It includes aromatherapy, nutraceuticals, enzymes from plants etc. Opportunity for students who wants to become industrialist using plant products.

SEMESTER-IV

Unit I : Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture Gardening

This unit has been devised for those who want to learn more about gardening and maintaining plants at home. It is also for those who want to develop as a successful entrepreneur in the field of landscape gardening.

Unit II : Biotechnology

This unit teaches basics of plant tissue culture, totipotency, organogenesis, organ culture, R-DNA technology, etc. It is a great opportunity for to all non-biology students to know the basics in biotechnology.

Unit III : Biostatistics and Bioinformatics

This unit helps in understanding the statistics in relation to biology. It's a great opportunity for the statistics and Mathematics students to have firsthand experience to study biology. This unit is also useful in learning basics in bioinformatics