BHIWAPUR MAHAVIDYALAYA, BHIWAPUR

ARTS, COMMERCE & SCIENCE (JUNIOR & SENIOR)
ACCREDITED WITH GRADE B (CGPA- 2.54) BY NAAC BENGALURU

Syllabus of Bridge Course
Academic Session 2017- 2018

Under Graduate

(B. A-I, B. Com-I & B. Sc.- I)

FOREWORD

The need to introduce a Bridge Course was to ease the transition of students from Higher Secondary to a University system of academics and examination patterns.

A week-long course designed by the faculties exposes the students to understand and facilitate the use of academic conventions. Bridge Course in Languages helps the students to prepare in developing their Reading, Writing, and Listening & Speaking Skills. Likewise Bridge Courses in Social Sciences, Science & Professional Courses create an amiable academic environment necessary for better understanding of the prescribed syllabi.

The advantage of Bridge Courses is that it creates a necessary basis to augment students' communication in social conversations, academic discussions and presentations.

Principal

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Undergraduate

BHIWAPUR MAHAVIDYALAYA, BHIWAPUR
COMPULSORY ENGLISH

Introduction

The need to introduce a Bridge Course was to ease the transition of students from Higher Secondary to a University system of academics and examination patterns.

A week-long course exposes the students to understand and use of academic conventions. Especially the English Bridge Course helps the students to improve their writing and reading skills. It enhances their communication in social conversations, academic discussions and presentations.

Objectives

- To communicate freely in all conversations
- To understand, apply and explain in their use of English language
- To write summaries and short reports in an academic style
- To improve grammar, vocabulary and pronunciation
- To improve writing, reading and listening skills
- Learn to respond to feedback
- Become an independent learner

Schedule

Duration – One week
Contact Hours – as per the schedule (Time Table)
Beneficiaries – Students of BA –I
Subject – Compulsory English

Syllabus

Unit -1

Sentence Structure
Word Order
Subject / Predicate

Unit -2

Parts of Speech
Nouns, Pronouns, Adjectives &Verbs

Unit -3

Articles & Prepositions

Unit -4

Pattern of University Question Paper & expected answers
Understanding the format of Questions
Practice of writing Long Answers for Long answer Questions

Unit -5

Speaking Skills
Accent & Rhythm
Pronunciation
Stress & Intonation

Methodology

1. Extensive use of worksheets as per the syllabus mentioned above
2. Practice of speaking skills with the help of audio-visuals
3. Reference to the prescribed text book

4. Reference to previous years' question papers
5. Data bank of Questions (short answer questions, Long answer questions, very short answer questions)

Conclusion

Bridge course being short and functional in nature yielded visible outcomes. Each Unit based on diagnosis of the past experiences of the faculty provided an accelerated and focused learning opportunity for the students. The faculty had an added opportunity for tutoring and mentoring.

DEPARTMENT OF MARATHI

अभ्यासक्रम

बी.ए. भाग–1. मराठी

मराठी साहित्य महामंडळाचे लेखनविशयक नियम–

1) अनुस्वार (टिंब)

उदा. चिंच,तंटा,निबंध,गुलकंद,जातांना,पंडित, चंचल.

अ) नामांच्या व सर्वनामांच्या अनेकवचनी सामान्यरूपांवर विभक्तीप्रत्यय व षब्दयोगी अव्यय लावताना अनुस्वार द्यावा. (एकवचन)(अनेकवचन)

उदा. लोकांना, मुलांनी, घरांपुढे, तुम्हांस, लोकांसमोर.

उदा. मुलास (एकवचन) मुलांस (अनेकवचन)

घरात (एकवचन) घरांत (अनेकवचन)

ब) लिंगानुसार बदलणाऱ्या विषेशणांच्या नपुसकलिंगी रूपावर येणारे अनुस्वार–

उदा. काळीं–गोरीं (मुलें) चांगली (फळें) पांढरी (फुलें)

अर्थभेद– उदा. नाव (नौका), नांव (नाम), पांच (संख्या) पाच (रत्नप्रकार), कां (कारण) का (काय)

2) ऱ्हस्व–दिर्घ

मराठीतील तत्सम इ–कारान्त आणि उ–कारान्त षब्द दिर्घ लिहावा.

उदा. कवी, मती, गती. पाटी, जादू, विनंती.

:–उपान्त्य दिर्घ ई–ऊ असलेल्या षब्दाचा ईकार–ऊकार सामान्यरूपाच्या वेळी ऱ्हस्व लिहावा.

डदा. गरिबास,वकिलांना, सुनेला, वसुलाची, नागपुरास.

3) **पूर हा ग्रामवाचक षब्द कोणत्याही ग्रूनामास लावताना दिर्घोपान्त्य लिहावा.**

उदा. भिवापूर, नागपूर, तारापूर, चंद्रपूर, सोलापूर.

:–व्यावहारिक मराठीः स्वरूप आणि भूमिका–

अ) पत्रलेखन

ब) सारांषलेखन

क) बातमीलेखन

ड) मुलाखतलेखन

इ) भाशांतर

DEPARTMENT OF ECONOMICS

BRIDGE COURSE REPORTING

11/7/2017 TO 15/07/2017

Sr. No.	Name of Topic	Objective	Areas to be covered	Suggested Methodology	Teaching Aids	Time & Date	Attend Students
01	Basic Concept of Economics	Importance of Basic Concept in Economics	Demand: Meaning & Definition Supply: Meaning & Definition	Lecture cum interaction With Students	White Board	45 Minutes 11/7/17 9.15 to 10.00	10
02	Basic Concept of Economics	Importance of Basic Concept in Economics	Utility: Meaning, Definition, Types & Characteristics	Lecture cum interaction With Students	White Board	45 Minutes 12/7/17 9.15 to 10.00	14
03	Economics Definition	Understand the Importance of Economics Definition	Definition: Adam smith, Dr. Marshal, Prof. Robbins	Lecture cum interaction With Students	White Board	45 Minutes 13/7/17 10.15to 11.00	16
04	Teaching Methods of Economics	Importance of Teaching Methods in Economics	Micro & Macro Methods: Meaning, Definition, Advantages and Dis-Advantages	Lecture method &Activity method	White Board	45 Minutes 14/7/17 8.30 to 9.15	25
05	Teaching Methods of Economics	Importance of Teaching Methods in Economics	Deductive & Inductive Methods: Meaning, Definition, Advantages and Dis-Advantages	Lecture method &Activity method	White Board	45 Minutes 15/7/17 8.30 to 9.15	35

DEPARTMENT OF SOCIOLOGY

Introduction

Objectives 1) The paper to induct the students to Sociology as the beginner of the subject.

2) the paper thus aims to expose the students to the basic concepts in Sociology

Duration – One week

Contact Hours – as per the schedule (Time Table) 12/07/ 2017 to 19/07/2017
45 min. each everyday

Beneficiaries – B.A. I Sem. Sociology Students

Subject – Relevant Subjects of First Year

Syllabus

Unit -1 Sociology meaning, Definition

Unit -2 Basic concepts in sociology- Society, Groups, Community

Unit -3 Modern Industrial society

Unit -4 Its characteristics industrialism, capitalism, urbanism, Liberal democracy

Unit -5 Socialization

Methodology - Lecture method

Conclusion - Unit test conducted & found that these concepts cleared

DEPARTMENT OF HISTORY

BRIDGE COURSE REPORTING

10/07/2017 TO 15/07/2017

Sr. No.	Name of Topic	Objective	Areas to be covered	Suggested Methodology	Teaching Aids	Time & Date
01	What is History? Its appearance and scope	To make the students aware of the meaning of history, its interpretation as well as the nature and scope of history	From ancient times to modern times	Lecture cum interaction With Students	White Board & Marker pen	10/7/2017 Time 11.00 to 11.45
02	Tools of history 1) Primary tools 2) Secondary devices	Explain the importance of primary and secondary tools to the students	Primary Tools - Physical Tools, Intangible Tools, Literary Tools, Non-Physical Tools	Lecture cum interaction With Students	White Board & Marker pen	11/7/2017 Time 11.45 to 12.30
03	Prehistoric	To impart knowledge of prehistoric times to the students	Paleolithic or Old Stone Age, Neolithic Age and Metal Age	Lecture cum interaction With Students	White Board & Marker pen	12/7/2017 Time 11.00 to 11.45
04	Subaltern, local and oral history	Explain the importance of Subaltern, local and oral history	From ancient times to modern times	Lecture cum interaction With Students	White Board & Marker pen	13/7/2017 Time 11.45.12. 30
05	Studies and teaching methods in history	Explain to students the teaching and learning methods in history	From ancient times to modern times	Lecture cum interaction With Students	White Board & Marker pen	14/7/2017 Time 11.00 to 11.45
06	Important of History	Explain the importance of history	From ancient times to modern times	Lecture cum interaction With Students	White Board & Marker pen	15/7/2017 Time 7.45 to 8.30

ENGLISH LITERATURE

Introduction:

Students will be introduced to different forms and movements of English Poetry. A brief peep into literary devices and types will orient the minds to appreciate literature in its originality.

Methodology: Lecture Method
Beneficiaries: BA-I
Duration: one week

Syllabus

Unit –I

Poetical Types: The Ode, The Sonnet, The Elegy, The Epic, The Satire

Unit -2

Schools and Movements: The Metaphysical Movement, The Classical Movement, The Romantic Revival, The Pre Raphaelite, Modern and Post -Modern Poetry.

Unit -3

A brief sketch of history of English Literature with details on different ages and the history and culture of the land.

Unit -4

Use of Literary Terms in poetry

Methodology

1. Extensive use of worksheets as per the syllabus mentioned above
2. Reference to the prescribed text book
3. Reference to previous years' question papers
4. Data bank of Questions (short answer questions, Long answer questions, very short answer questions)

Conclusion

Bridge course yielded visible outcomes as each unit was extensively dealt with referring to the Historical Background

DEPARTMENT OF COMMERCE

COMPULSORY ENGLISH

Introduction

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- To improve grammar, vocabulary and pronunciation
- To improve writing, reading and listening skills
- Learn to respond to feedback
- Become an independent learner

Schedule

Duration – One week

Contact Hours – as per the schedule (Time Table)

Beneficiaries – BA –I /B. Com (120 Students)

Subject – Compulsory English

Syllabus

Unit -1

Sentence Structure

Word Order

Subject / Predicate

Unit -2

Parts of Speech

Nouns, Pronouns, Adjectives &Verbs

Unit -3

Articles & Prepositions

Unit -4

Pattern of University Question Paper & expected answers

Understanding the format of Questions

Practice of writing Long Answers for Long answer Questions

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Speaking Skills

Accent & Rhythm

Pronunciation

Stress & Intonation

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Conclusion

Bridge Course being short and functional in nature yielded visible outcomes. Each Unit based on diagnosis of the past experiences of the faculty provided an accelerated and focused learning opportunity for the students. The faculty had an added opportunity for tutoring and mentoring.

COMPANY LAW

UNIT I

- कंपनीचा अर्थ (Company Meaning)
- कंपनीचा व्याख्या (Company Definition)
- कंपनीचे वैषीश्टये (Characteristics of Company)
- कंपनीचे प्रकार (Kinds of Company)

UNIT II

- खाजगी कंपनी व सार्वजनिक कंपनीचा अर्थ (Distinction between Private and Public Company)
- खाजगी कंपनी व सार्वजनिक कंपनीयातील फरक (Distinction between Company and Partnership Firm)
- सयुक्त कंपनी व भागीदारी कंपनी यातील फरक

UNIT III

कंपनीची स्थापना (Formation of Company)

- प्रर्वतनाचा अर्थ (Meaning of Promotion)
- प्रर्वतनाची व्याख्या(Definition of Promotion)
- प्रर्वतकाचा अर्थ (Meaning of Promoters)
- प्रर्वतकाची व्याख्या (Definition of Promoters)
- प्रर्वतकाची कार्य (Duties of Promoters)

UNIT IV

कंपनीचे सभासद (Members of Company)

- भागधारक व सभासदाचाअर्थ (Meaning of Members & Shareholder)
- सभारदाची व्याख्या (Definition of Member)
- भागधारक व सभारदयातील फरक (Distinction between a Member and a Shareholder)
- सभारदाचे प्रकार (Kinds of Member)

FINANCIAL ACCOUNTING

UNIT I

- Meaning of Book-keeping & Accounting
- Objects of Accounting
- Function of Accounting
- Branches of Accounting

UNIT II

- Type of Accounting
- Books of Book-keeping and Accountancy: Journal, Ledger,
- Types of Subsidiary Books- Purchase Book, Sales Book, Sales Return books, Bill Payable Book Cash Book

UNIT III

- Type of Cash Books
- Trial Balance
- Journal Entries.

UNIT IV

- **Final Accounts**
- Trading Account
- Profit & Loss Account
- Balance Sheet

DEPARTMENT OF SCIENCE

COMPULSORY ENGLISH

OBJECTIVES OF THE COURSE

- To bridge the gap between subjects studied at Pre-University level and the subjects they would be studying at the entry level of B.Sc. Programme.
- To develop soft skills among the students.
- To make the subject more comprehensive**.**

METHOD OF TEACHING

Group discussion, question-answer method, PPT presentation.

Unit: I Grammar

A. Use of Tenses

B. Change the Voice

C) Articles

Unit II: Comprehension of Unseen Passage

Unit III: Vocabulary

Unit IV: Subjective and Objective Poetry

Unit V: Conversational Skills

A) Apologising And Responding to An Apology

B) Congratulating And Responding to Congratulations

Conclusion- The Bridge Course was fruitful for the students. It helped the students to improve their learning process. The overall response from the students was also satisfactory.

DEPARTMENT OF CHEMISTRY

Introduction
Objectives
Duration – One week
Contact Hours – as per the schedule (Time Table)
Beneficiaries –B.Sc.
Subject – Relevant Subjects of First Year
Syllabus
Unit -1- Atomic Structure
Unit -2- Periodicity
Unit -3 - Thermodynamics
Unit -4 – Surface chemistry
Methodology – Moodle
Conclusion – Good response from students

DEPARTMENT OF ZOOLOGY

Introduction:

Any study that involves animals as its primary focus can be considered a part of zoology.

Zoology is the branch which deals with the study of the animal kingdom, its classification, habits and habitats, living and extinct, morphology, physiology, embryology, anatomy, cytology, genetics, histology, neonatology, taxonomy and evolution.

Although familiar with the subject zoology the entire zoology syllabus of BSc. deals with new terms and topics which will be a problem for the students coming from 12^{th} science to understand in one stoke. So to revise, update and groom students with basics in theory and practicals a bridge course of zoology subject is organized by Dr. Nitisha V. Patankar, Department of Zoology, Bhiwapur Mahavidyalaya, Bhiwapur.

Objective:

- To revise the basics of zoology based and to introduce new topics and syllabus of Bsc. I, subject zoology so that students gets familiar with the terms which will be used during regular classes.
- To understand the fundamentals of the subdisciplines in biology including taxonomy, **cell and molecular biology,** genetics, physiology, biodiversity, **ecology** and applied zoology**.**
- To understand basic methods and aims of the science of biology.
- To make students able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology.
- To make students able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.
- To make students able to identify the major groups of organisms with an emphasis on animals and be able to classify them within a phylogenetic framework.

- To make students able to compare and contrast the characteristics of animals that differentiate them from other forms of life.

- To develop the practical biological skills of the students.

Syllabus

Unit I - Phylums of animal kingdom:

1.1 Phylum- Protozoa, ***Phylum*** – Porifera, ***Phylum*** – Coelenterata (Cnidaria,) ***Phylum*** – Ctenophora.

1.2 Phylum – Platyhelminthes, ***Phylum*** – Aschelminthes (Nemotoda), ***Phylum*** – Annelida

1.3 ***Phylum*** – Arthropoda. ***Phylum*** – Mollusca. ***Phylum*** – Echinodermata.

1.4 Phylum- Chordata. (Hemichordata, Protochordata, Urochordata, Cepahalochordata and vertebrata)

1. Phylum Protozoa (Approximately 30,000 Known Species):

Unicellular Animals like Amoeba, Paramoecium, Monogystis and Malaria parasite. Protozoa are microscopic in size. Each individual consists of only one cell which has to carry on all the vital activities. They are abundantly found in water containing decaying organic matter. Some, such as the dysentery amoeba and the malaria parasite, live within other animals. Still others live in damp soil, or in fresh water, or in the sea. The single-celled condition is an important feature which sets the protozoa apart from all other animals. These unicellular creatures have therefore been placed in the subkingdom protozoa, which includes only one phylum, the protozoa. The remaining phyla of animals, all of which are many-celled, comprise the sub- kingdom metazoa.

2. Phylum-Porifera (Approximately 5000 Known Species):

Sponges.

These are pore-bearing sedentary animals found mostly in the sea. A few species occur in the fresh water but none on the land. The sponges, like plants, are attached to a substratum. The outer surface of the sponge is perforated by numerous pores and the body wall is supported by a framework which is composed of lime, or of silica or of an organic substance called spongin.

3. Phylum Cnidaria (Approximately 10,000 Known Species):

Hydra, Jelly-Fishes, Sea-Anemones and Corals.

Most of the cnidaria are marine but Hydra is found in fresh water. Some, such as the corals and sea-anemones, are attached to a substratum; others are slow moving or adapted for drifting in the water. All are radially symmetrical. This means that the animal is the same all round, and has no right or left side. It is symmetrical around a median vertical axis, and can be divided into similar halves by a number of vertical planes. Body wall is composed of two layers; it encloses a central digestive cavity which communicates with the exterior by only one opening, the mouth. Thus, the cnidarian body is essentially a two-layered hollow sac opening by the month; the sac may be tubular, as in hydra, or saucer-shaped, as in jelly fish. There are movable arm like structures near the mouth, called tentacles, which carry peculiar stinging cells for stunning the prey.

4. Phylum Ctenophora (Approximately 80 Species):

Beroe, Hormiphora, Pleurobrachia.

The phylum derives its name from two Greek words—Ktenos= comb, phoros= bearing. Ctenophores are all marine. They have bi-radially symmetrical bodies. They possess eight meridionally placed ciliated plates. They resemble the cnidarians on many counts but differ from them in not having the nematocysts. Their ectomesoderm is gelatinous and bear mesenchymal muscle cells. They possess a specialized aboral sense organ and the tentacles bear adhesive cells. All are planktonic.

5. Phylum Platyhelminthes (Approximately 6500 Known Species):

Flat-worms, Flukes and Tape-worms.

These are flat, un-segmented, worm-like creatures with soft and bilaterally symmetrical body. In a bilaterally symmetrical animal there is a right side and a left side, a fore end and a hind end, a dorsal or back surface and a ventral or front surface. There is only one plane of symmetry by which the body can be divided into two equal halves. Leaf-like liver-flukes and ribbon-like tapeworms are parasites but there are several free-living species, marine as well as fresh-water. Digestive canal is incomplete, with only one opening, the mouth; there is no anus. Excretion of waste products is effected by peculiar flame cells.

6. Phylum Nemathelmlnthes (Approximately 10,000 known Species):

Round-worms.

These are cylindrical, un-segmented, worm-like animals with soft, bilaterally symmetrical body, tapering at both the ends. Digestive canal is complete, with two openings, a mouth in front and an anus behind; it is a straight tube running through the

body from end to end. Most of the group are aquatic. A few inhabits damp soil. Others, such as hook-worms, thread-worms and filaria worms are parasites of man and cattle.

7. Phylum Annelida (Approximately 7500 Know Species):

Earth-worms, Leeches and Sand-worms.

These are true worms with soft, elongated, bilaterally symmetrical body, divided into a series of ring-like segments or meta- meres. The annelids are, therefore, known as the segmented worms. The annelidan body is built on the tube-within-a-tube plan. The outer tube represents the body wall and the inner tube represents the digestive canal. The two tubes are separated from one another by a space called body cavity or coelom. Most of the annelids, such as the sand-worms, are marine; others, like the leeches, are fresh-water; but the earth-worm is sub-terrestrial.

8. Phylum Arthropoda (Approximately 750,000 Known Species):

Prawns, Crabs, Cockroaches, Centipedes, Millipedes, Scorpions, and Spiders.

Arthropods are bilaterally symmetrical, segmented animals with soft parts of the body protected by a hard chitinous external skeleton. Each segment of the body bears paired legs or appendages which are jointed. This phylum is the largest of the animal phyla and includes nearly three-fourths of all the known species of animals.

9. Phylum Mollusca (Approximately 90,000 Known Species):

Clams, Oysters, Snails, Cuttle-fishes and Octopus.

Molluscs are un-segmented and without appendages. The soft parts of the body are enclosed in a Hard calcareous shell, as in snails and oysters. A fleshy muscular foot for locomotion is often present. Many of the molluscs are marine, some are fresh-water, and a few like the garden snails are terrestrial.

10. Phylum Echinodermata (Approximately 6,000 Known Species):

Starfishes, Sea-urchins, Sea-cucumbers and Sea-lilies.

Echinoderms are characterized by spiny skin. All are marine, inhabiting the shore and bottom of the sea. A few such as the sea-lilies are attached; but the majority are free to move about. Locomotion is very sluggish and effected by peculiar structures called tube-feet. This is the only phylum possessing a water- vascular system. The body is radially symmetrical and star-like as in starfishes, brittle-stars and basket-stars.

11. Phylum Chordata (Approximately 100,000 Known Species):

Balanoglossus, Ascidians, Amphioxus and Vertebrates.

The chordates possess a stiff supporting rod, called notochord. Leaving aside a few lower forms, such as balanoglossus, ascidians and amphioxus, all chordates are

vertebrates. Vertebrates possess the backbone which forms the supporting skeleton for the long axis of the body. Vertebrate body is bilaterally symmetrical and is typically composed of head, trunk and tail. There are two pairs of appendages, either in the form of paired fins or limbs, or wings. They comprise the highest animals and include man.

Vertebrates are divided into the following classes:

(1) The cyclostomata including lampreys and hag fishes which are round- mouthed and without a lower jaw;

(2) The chondrichthyes or cartilaginous fishes such as sharks and electric rays;

(3) The osteicthyes or body fishes like Bhetki and Rohu;

(4) The amphibians such as toads, frogs and salamanders with moist, naked skin;

(5) The reptiles including snakes, lizards, tortoises and crocodiles with scales on their outer surface;

(6) The aves or birds with feathers and wings for flight;

(7) The mammals including duck-billed mole, kangaroo, guinea-pig and man, with hairy skin and with young ones fed by the mother with her own breast-milk.

Unit II Cell

2.1 Ultrastructure of prokaryotic and eukaryotic cell.

2.2 Different cell organelles- endoplasmic reticulum, golgi bodies, mitochondria, lysosome, nucleus, neucleolus.

2.3 chromatin material

2.4 Mitosis and meiosis

Unit III- Environmental Biology

2.1 Principal layers of atmosphere- Exosphere, theremosphere, mesosphere, Statosphere, Troposphere.

2.2. Lithosphere

2.3 Hydrosphere

2.4 Pyramids

Principal layers

In general, air pressure and density decrease with altitude in the atmosphere. However, temperature has a more complicated profile with altitude, and may remain relatively constant or even increase with altitude in some regions (see the temperature section, below). Because the general pattern of the temperature/altitude profile is constant and

measurable by means of instrumented balloon soundings, the temperature behavior provides a useful metric to distinguish atmospheric layers. In this way, Earth's atmosphere can be divided (called atmospheric stratification) into five main layers. Excluding the exosphere, the atmosphere has four primary layers, which are the troposphere, stratosphere, mesosphere, and thermosphere. From highest to lowest, the five main layers are:

- Exosphere: 700 to 10,000 km (440 to 6,200 miles)
- Thermosphere: 80 to 700 km (50 to 440 miles)
- Mesosphere: 50 to 80 km (31 to 50 miles)
- Stratosphere: 12 to 50 km (7 to 31 miles)
- Troposphere: 0 to 12 km (0 to 7 miles)

Exosphere

The exosphere is the outermost layer of Earth's atmosphere (i.e. the upper limit of the atmosphere). It extends from the exobase, which is located at the top of the thermosphere at an altitude of about 700 km above sea level, to about 10,000 km (6,200 mi; 33,000,000 ft) where it merges into the solar wind. This layer is mainly composed of extremely low densities of hydrogen, helium and several heavier molecules including nitrogen, oxygen and carbon dioxide closer to the exobase. The atoms and molecules are so far apart that they can travel hundreds of kilometers without colliding with one another. Thus, the exosphere no longer behaves like a gas, and the particles constantly escape into space. These free-moving particles follow ballistic trajectories and may migrate in and out of the magnetosphere or the solar wind. The exosphere is located too far above Earth for any meteorological phenomena to be possible. However, the aurora borealis and aurora australis sometimes occur in the lower part of the exosphere, where they overlap into the thermosphere. The exosphere contains most of the satellites orbiting Earth.

Thermosphere

The thermosphere is the second-highest layer of Earth's atmosphere. It extends from the mesopause (which separates it from the mesosphere) at an altitude of about 80 km (50 mi; 260,000 ft) up to the thermopause at an altitude range of 500–1000 km (310–620 mi; 1,600,000–3,300,000 ft). The height of the thermopause varies considerably due to changes in solar activity. Because the thermopause lies at the lower boundary of the exosphere, it is also referred to as the exobase. The lower part of the thermosphere, from 80 to 550 kilometers (50 to 342 mi) above Earth's surface, contains

the ionosphere. The temperature of the thermosphere gradually increases with height. Unlike the stratosphere beneath it, wherein a temperature inversion is due to the absorption of radiation by ozone, the inversion in the thermosphere occurs due to the extremely low density of its molecules. The temperature of this layer can rise as high as 1500 °C (2700 °F), though the gas molecules are so far apart that its temperature in the usual sense is not very meaningful. The air is so rarefied that an individual molecule (of oxygen, for example) travels an average of 1 kilometer (0.62 mi; 3300 ft) between collisions with other molecules.[13] Although the thermosphere has a high proportion of molecules with high energy, it would not feel hot to a human in direct contact, because its density is too low to conduct a significant amount of energy to or from the skin. This layer is completely cloudless and free of water vapor. However, non-hydrometeorological phenomena such as the aurora borealis and aurora australis are occasionally seen in the thermosphere. The International Space Station orbits in this layer, between 350 and 420 km (220 and 260 mi).

Mesosphere

The mesosphere is the third highest layer of Earth's atmosphere, occupying the region above the stratosphere and below the thermosphere. It extends from the stratopause at an altitude of about 50 km (31 mi; 160,000 ft) to the mesopause at 80–85 km (50–53 mi; 260,000–280,000 ft) above sea level. Temperatures drop with increasing altitude to the mesopause that marks the top of this middle layer of the atmosphere. It is the coldest place on Earth and has an average temperature around −85 °C (−120 °F; 190 K). Just below the mesopause, the air is so cold that even the very scarce water vapor at this altitude can be sublimated into polar-mesospheric noctilucent clouds. These are the highest clouds in the atmosphere and may be visible to the naked eye if sunlight reflects off them about an hour or two after sunset or a similar length of time before sunrise. They are most readily visible when the Sun is around 4 to 16 degrees below the horizon. Lightning-induced discharges known as transient luminous events (TLEs) occasionally form in the mesosphere above tropospheric thunderclouds. The mesosphere is also the layer where most meteors burn up upon atmospheric entrance. It is too high above Earth to be accessible to jet-powered aircraft and balloons, and too low to permit orbital spacecraft. The mesosphere is mainly accessed by sounding rockets and rocket-powered aircraft.

Stratosphere

The stratosphere is the second-lowest layer of Earth's atmosphere. It lies above the troposphere and is separated from it by the tropopause. This layer extends from the top of the troposphere at roughly 12 km (7.5 mi; 39,000 ft) above Earth's surface to the stratopause at an altitude of about 50 to 55 km (31 to 34 mi; 164,000 to 180,000 ft). The atmospheric pressure at the top of the stratosphere is roughly 1/1000 the pressure at sea level. It contains the ozone layer, which is the part of Earth's atmosphere that contains relatively high concentrations of that gas. The stratosphere defines a layer in which temperatures rise with increasing altitude. This rise in temperature is caused by the absorption of ultraviolet radiation (UV) radiation from the Sun by the ozone layer, which restricts turbulence and mixing. Although the temperature may be −60 °C (−76 °F; 210 K) at the tropopause, the top of the stratosphere is much warmer, and may be near 0 °C. The stratospheric temperature profile creates very stable atmospheric conditions, so the stratosphere lacks the weather-producing air turbulence that is so prevalent in the troposphere. Consequently, the stratosphere is almost completely free of clouds and other forms of weather. However, polar stratospheric or nacreous clouds are occasionally seen in the lower part of this layer of the atmosphere where the air is coldest. The stratosphere is the highest layer that can be accessed by jet-powered aircraft.

Troposphere

The troposphere is the lowest layer of Earth's atmosphere. It extends from Earth's surface to an average height of about 12 km (7.5 mi; 39,000 ft), although this altitude varies from about 9 km (5.6 mi; 30,000 ft) at the geographic poles to 17 km (11 mi; 56,000 ft) at the Equator,[12] with some variation due to weather. The troposphere is bounded above by the tropopause, a boundary marked in most places by a temperature inversion (i.e. a layer of relatively warm air above a colder one), and in others by a zone which is isothermal with height. Although variations do occur, the temperature usually declines with increasing altitude in the troposphere because the troposphere is mostly heated through energy transfer from the surface. Thus, the lowest part of the troposphere (i.e. Earth's surface) is typically the warmest section of the troposphere. This promotes vertical mixing (hence, the origin of its name in the Greek word τρόπος, *tropos*, meaning "turn"). The troposphere contains roughly 80% of the mass of Earth's atmosphere.[19] The troposphere is denser than all its overlying atmospheric layers because a larger atmospheric weight sits on top of the troposphere

and causes it to be most severely compressed. Fifty percent of the total mass of the atmosphere is located in the lower 5.6 km (3.5 mi; 18,000 ft) of the troposphere. Nearly all atmospheric water vapor or moisture is found in the troposphere, so it is the layer where most of Earth's weather takes place. It has basically all the weather-associated cloud genus types generated by active wind circulation, although very tall cumulonimbus thunder clouds can penetrate the tropopause from below and rise into the lower part of the stratosphere. Most conventional aviation activity takes place in the troposphere, and it is the only layer that can be accessed by propeller-driven aircraft.

Other layers

Within the five principal layers that are largely determined by temperature, several secondary layers may be distinguished by other properties:

- The ozone layer is contained within the stratosphere. In this layer ozone concentrations are about 2 to 8 parts per million, which is much higher than in the lower atmosphere but still very small compared to the main components of the atmosphere. It is mainly located in the lower portion of the stratosphere from about 15–35 km (9.3–21.7 mi; 49,000–115,000 ft), though the thickness varies seasonally and geographically. About 90% of the ozone in Earth's atmosphere is contained in the stratosphere.
- The ionosphere is a region of the atmosphere that is ionized by solar radiation. It is responsible for auroras. During daytime hours, it stretches from 50 to 1,000 km (31 to 621 mi; 160,000 to 3,280,000 ft) and includes the mesosphere, thermosphere, and parts of the exosphere. However, ionization in the mesosphere largely ceases during the night, so auroras are normally seen only in the thermosphere and lower exosphere. The ionosphere forms the inner edge of the magnetosphere. It has practical importance because it influences, for example, radio propagation on Earth.
- The homosphere and heterosphere are defined by whether the atmospheric gases are well mixed. The surface-based homosphere includes the troposphere, stratosphere, mesosphere, and the lowest part of the thermosphere, where the chemical composition of the atmosphere does not depend on molecular weight because the gases are mixed by turbulence. This relatively homogeneous layer ends at the *turbopause* found at about 100 km (62 mi; 330,000 ft), the very edge of space itself as accepted by the FAI, which places it about 20 km (12 mi; 66,000 ft) above the mesopause.

Above this altitude lies the heterosphere, which includes the exosphere and most of the thermosphere. Here, the chemical composition varies with altitude. This is because

the distance that particles can move without colliding with one another is large compared with the size of motions that cause mixing. This allows the gases to stratify by molecular weight, with the heavier ones, such as oxygen and nitrogen, present only near the bottom of the heterosphere. The upper part of the heterosphere is composed almost completely of hydrogen, the lightest element.

- The planetary boundary layer is the part of the troposphere that is closest to Earth's surface and is directly affected by it, mainly through turbulent diffusion. During the day the planetary boundary layer usually is well-mixed, whereas at night it becomes stably stratified with weak or intermittent mixing. The depth of the planetary boundary layer ranges from as little as about 100 metres (330 ft) on clear, calm nights to 3,000 m (9,800 ft) or more during the afternoon in dry regions.

The average temperature of the atmosphere at Earth's surface is 14 °C (57 °F; 287 K) or 15 °C (59 °F; 288 K), depending on the reference.

Ecological Pyramid

It is a graphic representation of the relationship between organisms at various trophic levels in a food chain. The basis of an ecological pyramid is the biomass, energy, and number. Just as the name suggests ecological pyramids are in the shape of a pyramid. The concept was first introduced by Charles Elton, the pioneer British Ecologist.

Types of Ecological Pyramids

Depending on the factors that we use to represent an ecological pyramid, there are three types. They are:

- *Pyramid of numbers*– Here the factor that is taken into account is the number of organisms in each trophic level. As we go up the levels of the pyramid, the number of organisms decreases. The producers form the largest number and hence are at the bottom of the pyramid.
- *Pyramid of energy*– This is an upright pyramid that represents the flow of energy from the producers to the final consumers.
- *Pyramid of biomass* – This pyramid represents the amount of biomass of the organisms present at each trophic level. Biomass is nothing but the weight of the organisms.

Unit IV Applied Zoology

4.1 Aquaculture- Pisciculture, Prawn culture and Pearl culture

4.2 Sericulture, Apiculture, Lac culture, Vermiculture.

4.3 Crop pests

4.4 Animal pests

Materials and Methods

- A screen to show the video and copies of the What is Zoology? - Definition, Branches, & Tools lesson
- LCD with PowerPoint presentation or Interactive board teaching and verbal teaching.
- Student computers
- Text books for reference – theory and practical purpose
-

Conclusions:

At the end of the course Learning outcomes:

- The student will have an enhanced knowledge and appreciation of topics related to zoology subject
- The student will be able to develop interest and will be confident to perform in examination.
- The student will be able to perform, analyse and report on experiments and observations in all academic sessions
- The student will be able to integrate related topics from separate parts of the course.
- The student will be able to Place biological knowledge in context and show an understanding of the way biologists think and of the historical development of biological thought.
- The student will be to demonstrate the ability to connect and apply biological knowledge to other disciplines and to integrate knowledge into their personal and professional lives;
- The student will be to demonstrate the ability to engage in critical, independent, and creative thinking; and
- The student will be to demonstrate proficiency in writing and speaking about biological concepts and research.

DEPARTMENT OF BOTANY

INTRODUCTION:

Any study that involves Plants as its primary focus can be considered a part of Botany. Botany is the branch which deals with the study of the plant kingdom, its classification, habits and habitats, living and extinct, morphology, physiology, embryology, anatomy, cytology, genetics, histology, neonatology, taxonomy and evolution.

Although familiar with subject Botany the entire syllabus of B.Sc. Botany deals with new terms and topics which will be a problem for students coming from 12" class to understand in one stoke. So to revise, update and groom students with basics in Theory and Practicals a Bridge Course of Botany subject is organized by Asst. Prof. Sagar Yadav, Department of Botany, Bhiwapur Mahavidyalaya, Bhiwapur.

OBJECTIVE:

- To revise the basics of Botany subject and to introduce new topics and syllabus of B.Sc. I, Botany so that students gets familiar with the terms which will be used during regular classes.
- To understand the fundamentals of the sub disciplines in biology including taxonomy, cell and molecular biology, genetics, physiology, biodiversity, ecology and applied Botany.
- To understand basic methods and aims of the science of biology.
- To make students able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology.
- To make students able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.
- To make students able to identify the major groups of organisms with an emphasis on Plants and be able to classify them within a Phylogenetic framework.
- To make students able to compare and contrast the characteristics of Plants that differentiates them from other forms of life.
- To develop students' practical biological skills.

Duration — One week
Contact Hours —
Beneficiaries — B.Sc. I.
Subject — Botany

SYLLABUS

Unit I -

What is Botany – Concept, meaning, Father of Botany, different Botanist & their work,
Indian Botanist, evolution of Plants?
Systematic Botany – Concept of classification, how to write classification system, plant classification (5 kingdom System of classification), Important characters.

Unit II

Plant body – Introduction of Morphology, Introduction of Botanical terms & taxonomic terms, Economic importance of Plant.

MATERIALS AND METHODS

- A screen to show the video and copies of the What is Botany? - Definition, Branches, & Tools lesson
- Student computers
- Text books for reference — theory and practical purpose
- Practical materials

OUTCOMES

At the end of the course learning outcomes will be:

- The student has an enhanced knowledge and appreciation of topics related to Botany subject.
- Be able to develop interest and will be confident to perform in examination.
- Students have been familiar with basic Botany
- Be able to integrate related topics from separate parts of the course.
- Able to Place biological knowledge in context and show an understanding of the way biologists think and of the historical development of biological thought.
- Demonstrate the ability to connect and apply biological knowledge to other disciplines and to integrate knowledge into their personal and professional lives;
- Demonstrate the ability to engage in critical, independent, and creative thinking; and
- Demonstrate proficiency in writing and speaking about biological concepts and research.

DEPARTMENT OF MATHEMATICS

A Bridge course for newly admitted students is conducted every year before the commencement of the first semester classes

Objective

1) The main objective of the course is to bridge the gap between subjects studied at School/ Jr college level and subjects they would be studying in B.Sc. Graduation.
2) To make "learning of Mathematics as a pleasant experience".
3) To improve confidence of the slow learners to meet the knowledge requirements.
4) To prepare the new entrants for the intellectual challenges of a university education

I. Matrices

Introduction of matrices - Types of matrices -Operations on matrices.

Properties of matrices – Applications of matrices -Determinants - Relation between matrices and determinants - Properties of determinants.

II. Differential Calculus

Limits and continuity - Concepts of continuity - Derivatives of a function - Differentiation rules - Derivatives of trigonometric function.

Chain rule - Techniques of differentiation - Total and partial derivatives.

III. Integral calculus

Introduction of Indefinite and definite integrals- Properties of Indefinite and Definite Integrals-Proper and improper integrals-Applications of integration

Integration by Substitution - Integration by Parts - Integration by Partial Fraction

IV. Differential Equations

ODE - PDE - Applications of ODE & PDE - Formation of ODE & PDE.

Order - Degree of differential equations-Applications of Differential equation

Linear & nonlinear - Homogeneous & non homogeneous equations.

Bridge Course Outcome

Bridge course helps students to get basic knowledge and to learn the curriculum of the present class in this academic year.

It would enable the students to grasp the concepts of mathematics quickly and efficiently.

During this interaction of few days with the faculty, the students will come out of their hesitation and it will be the best platform for the students to interact with the faculty

members, making it responsible for them to build strong relationships with faculty and other students.

Also Bridge course gives them a breather, to prepare themselves before the onset of courses for first year degree programme.