

UNIVERSITY COLLEGE, MANGALORE

LIST OF OPEN ELECTIVE OFFERED FOR B.A STUDENTS (IVTH SEM)

SL.NO.	PROGRAMS	OPEN ELECTIVE COURSE
1	Kannada	BASKAOE 281 - Bahuroopi (Parikalpane, Nelajnyana-Vijnayana, Thantrajana)
2	Sanskrit	BASKOE 282 - Life Values Upanishaths Panchathantra, Hithopadesha
3	Hindi	BASHOE 282 - Media Lekhan
4	English	BASENOE 282 - Introduction to Poetry
5	Physics	BSCPHOE 283 - Basics of Communication and Astronomy
6	Botany	BSCBOOE 283 - Plant diversity for Human welfare
7	Zoology	BSCZOOE 283 - Vermitechnology
8	Mathematics	BSCMTOE 283 - Applications of basic Arithmetic's
9	Chemistry	BSCCHOE 283 - Chemistry for every day life
10	Microbiology	BSCMBOE 283 - Elementary Concepts of Microbiology
11	Computer Science	BSCCSOE283 Fundamentals of Information Technology
12	Commerce	BCMCMCOE 285 - Basic Accounting
13	Commerce	BCMCMCOE 287 - Personal Investment Management
14	Commerce	BCMCMCOE 288 - Banking Practices
15	Physical Education	BASPEOE 283 Health & Wellness

DETAILS OF COURSE PATTERNS AND SYLLABUS FOR PHYSICAL EDUCATION PROGRAMME IN UNDER GRADUATION

B.A/B.Com/B.Sc

Semester	Course	Credits	Theory marks	Practical Marks:	Internal:	Total Marks:
Fourth	Physical Education, Fitness, Wellness and Life Style Management	3	20	20	10	50

Semester IV Theory Course

Course: Physical Education, Fitness, Wellness and Life Style Management

Objectives:

To enable the students to:

- **Teach the students about the body and how it works**
- Understand the relationship between fitness and wellness
- Gain knowledge regarding various aspects and its practical implication fitness and Wellness.
- To know the behavior changes needed to ensure a good quality of life
- Evaluate health related fitness in order to make changes in lifestyle

Unit -1 Introduction to Physical Education

Concepts basic to the Nature and Meaning of Physical Education, Changed way of life, Outcomes of physical Education, the Physically Educated person, Principles of Physical Education. Movement Education for Special population.

Unit II – Fitness and Wellness

Concept of Fitness - Definition and meaning of Fitness, Different Kinds of Fitness - Physical Fitness, Skill Related and Health Related Physical Fitness, Relationship of fitness and health

Basic concept of wellness, Role of various factors in wellness, components of wellness, Physical fitness and wellness, Health benefits of Exercise. Exercise prescription.

Unit -III Fitness Evaluation and Activities (Practical)

General Warm up, Limbering down exercises. Free hand exercises, Stretching exercises
Swiss ball exercises

Fitness Evaluation –Measuring Cardio respiratory fitness. 1.5 mile run test, 1 mile walk
test. The Step test, Assessment of Flexibility, Skinfold test, BMI

Aerobic activities – Walking, Jogging, cycling etc. / Anaerobic Activities – Circuit
Training, Strength Activities, Agility and Coordinative activities, Body conditioning
activities like Calisthenics, Flexibility exercises. Physical Activity for Special population.

Unit – IV: Fundamental Skills of Games (Practical)

Game skills and Game practice of Football, Kabaddi, Volleyball, Basketball, Badminton,
Throwball, Wrestling, Kho-kho, Handball (Any Two)

Pilates, Aerobic Dance, Zumba, Fitness using Ball and other materials like parallel bars.
ropes, suspensions etc., Martial arts.

Physical Activity for Special population.

Reference

1. Harold M Barrow "Man and Movement: Principles of Physical Education" published in Great Britain by Henry Kimpton Publishers, London.
2. Jesse Peoring Williams "The Principles of Physical Education" Published by College Book House, Shivaji Road, Meerut.
3. William D McArdle, Frank I Katch and Vitor I Katch, Essential of Exercise Physiology, Second edition, New York: LipincoffWelliams and wilkins, 2000
C. Guyton, Physiology of Human Body, Philadelphia: Saunders Company, 1972.
4. Melwin H. Williams. Nutrition for Health Fitness and sport. McGraw Hill Company, Newyork: 1995
5. Bradford B, Strand and Others. Fitness Education Arizona GorsuchSeani; sbrick Publishers, 1997.
6. Scott K. Powers and Stephen L. Dodd. Total Fitness: Exercise, Nutrition and wellness, Boston: Allyn and Bacon, 1999.
7. Thomas D. Fahey and Others. Fit and Well 6th Edition; Newyork: MCGraw Hill Publishers, 2005.
8. Butryn, M.L., Phelan, S., & Hill, J. O. (2007). Consistent self-monitoring of weight: a key component of successful weight loss maintenance. Obesity (Silver Spring). 15(12), 3091-3096.
9. Chu, S.Y. & Kim, L. J. (2007). Maternal obesity and risk of stillbirth: a meta analysis. Am J Obstet Gynecol, 197(3), 223-228.

೧. ಲೋಕಲೂಟಿ ಎಲ್ಲೆ ಲೋಕಲೂಟಿ
ಕುರಂದರದಾಗ
೨. ಕುಲಕುಲ ಕುಲವೆಂದು ಕೊಡೆದಾಡದಿರಿ
ಕನಕದಾಗ
೩. ಇಂತಹ ಸುಂದರ ಪ್ರಾತಃಕಾಲದಿ
ಕುವೆಂಪು
೪. ಹುತ್ತರಿ ಹಾಡು
ಪಂಜೆ ಮಂಗಳೇಶರಾಯರು
೫. ಕುರುಡು ಕಾಂಬಾಣಾ
ದ.ರಾ. ಬೇಂದ್ರೆ
೬. ಯಾವ ಮೋಹನ ಮುರಲಿ ಕರೆಯಿತು
ಗೋಪಾಲಕೃಷ್ಣ ಅಡಿಗ
೭. ನನ್ನ ಜನಗಳು
ಸಿದ್ಧಲಿಂಗಯ್ಯ
೮. ಹಕ್ಕಿನ ಸೊತ್ತುಗಳು
ಕಾತ್ಯಾಯಿನಿ ಕುಂಜಿಬೆಟ್ಟು
೯. ನಲ್ಲಿಯಲ್ಲಿ ನೀರು ಬಂದಿತು!!!
ಸದಾಶಿವ
೧೦. ಮಾರಿಕೊಂಡವರು
ಹೇವನೂರು ಮಹಾದೇವಪ್ಪ ಸ್
೧೧. ಸಾಲಾಯ ತಸ್ಮೈನಮಃ
ಅ.ರಾ. ಮಿತ್ರ
೧೨. ಪುಸ್ತಕಗಳು
ಗಿರಡ್ಡಿ ಗೋವಿಂದರಾಜು ಸ್
೧೩. ಹರಿಸರದ ವಾಸ್ತವಿಕ ಪ್ರಜ್ಞೆ
ರಘುನಂದನ ಭಟ್ಟ

BASHOE 282
Group II Elective Course

Hindi Paper IV

मीडिया लेखन

This paper nurture students proficiency skill.

Teaching hrs per week : 2 Hrs (2 x 12=24)

Credit: 1

Semester Exam Duration: 2 Hrs

Total Marks: 50

Theory: 40

IA: 10

I. जनसंचार और मीडिया 1 hr x 12 = 12hrs

1. जनसंचार माध्यम और रचनात्मक लेखन
2. मुद्रित माध्यम के लिए लेखन - संपादकीय, पुस्तक समीक्षा, फ़िल्म समीक्षा
3. रेडियो के लिए लेखन - समाचार, नाटक, चर्चा
4. टेलीवीजन के लिए लेखन - समाचार, चर्चा, नाटक / धारावाहिक, डोक्यूमेंट्री

II. सिनेमा और साहित्य 1 hr x 12 = 12hrs

1. हिन्दी सिनेमा का इतिहास
2. सिनेमा में हिन्दी साहित्य का प्रतिबिंब

Prescribed Books:

1. विज्ञापन और हिन्दी - डॉ. पूर्णिमा आर, वाणी प्रकाशन, दिल्ली

DIVISION OF MARKS

Sl. No.	Pattern	Division of Marks	Total
I	Objective Type Questions	10x 1	10
II	Practical Writing (2 out of 4)	2 x 5	10
III	Essay Type Questions (1 out of 2)	1 x 10	10
IV	Short Notes (Unit I) (2 out of 4)	2 x 5	10
		Total	40

Mangalore University
Department of English

SYLLABUS FOR OPEN ELECTIVE COURSE (GENERAL) – ENGLISH

(Approved on December 7, 2018 BoS (UG), effective for batches commencing from 2019 onwards)

SEMESTER – IV

CHOICE BASED CREDIT SYSTEM

INTRODUCTION TO POETRY

(Objective: Enabling an exposure to a new discipline)

BASENOE 282

Teaching Hours: 2 per week

Total Credits: 01

Total Number of teaching hours per semester: 24

Evaluation – End semester examination 40 marks; Internal Assessment 10 marks (average marks of 2 tests or 1 test and 1 assignment)

Background:

Imagery/ Figures of Speech

Poems:

- | | |
|-------------------------|---------------|
| 1. When to the Sessions | Shakespeare |
| 2. Good Morrow | John Donne |
| 3. Next, Please | Philip Larkin |
| 4. Introduction | Kamala Das |
| 5. A Constable Calls | Seamus Heaney |

II B.COM IV SEMESTER

GROUP IV

OPEN ELECTIVE: Enabling an exposure to some other discipline & domain:

Basic Accounting

24 hours per Semester (2 hours per week)

No of Credits: 1

Unit I: Nature of Accounting.

Unit II: Accounting Process and Preparation of Trial Balance

Unit III: Preparation of three column cash book.

Unit IV: Preparation of Final Accounts of Sole Trader.

References:

1. Advanced Accounting Shukla M.C., Grewal T.S.
2. Advanced Accounting Gupta R.L.
3. Advanced Accounting Jain & Narang
4. Advanced Accounting Maheswari S.W. & Maheshwari S.K.
5. Advanced Accounting B.S.Raman
6. Advanced Accounting Basu & Das

OPEN. ELECTIVE

II B.COM IV SEMESTER

OF

Personal Investment Management

Learning Objective:

To enable the students to acquire basic knowledge and skills in managing personal investment and to understand the basics of investment in financial and capital market.

Unit I: Introduction to Investment:

4 hrs

1.1 Savings Vs Investment

1.2 Need for Investment

1.3 Principles of Investment:

1.3.1 Liquidity

1.3.2 Safety or Security

1.3.3 Profitability or return.

1.3.4 Other Considerations:

1.3.4.1 Tax implications

1.3.4.2 Rate of Interest

1.3.4.3 Inflation.

Unit II: Investment Avenues:

4 hrs

2.1 Term deposits

2.2 Insurance Policies

2.3 Retirement Plans

2.4 Real Estate

2.5 Gold and Bullion

2.6 Stock market securities

2.7 Mutual Funds.

Unit III: Investment in Stock Market Securities:

6 Hrs

3.1 Meaning of Stock market securities

3.2 How to Invest in Stock market

3.3 Stock indices: SENSEX, NIFTY.

3.4 Risks involved in Stock market investments.

3.5 Investor protection –SEBI. (Case Studies)

Unit IV: Investment in Mutual Funds:

5 Hrs

4.1 Meaning of Mutual Funds

4.2 Types/classification of Mutual Funds

4.3 How to Invest in Mutual Funds

4.4 Net Asset Value

4.5 Benefits of Mutual Fund Investment (Case Studies)

Unit V: Personal Investment Planning

4 Hrs

5.1 Personal Financial Planning (Case Studies)

5.2 Personal Investment Planning (Case Studies)

Suggested Readings:

1. Rustogi, R.P., Fundamentals of Investment, Sulthan Chand & Sons, New Delhi
2. Chandra, Prasanna, Investment Analysis and Portfolio Management. Tata McGraw Hill Publishing Limited.
3. Bhalla V K, Investment Management, S Chand, New Delhi
4. Avadhani V A, Securities Analysis and Portfolio Management, Himalaya publishing House, New Delhi
5. "Stock Market Book", Dalal Street Journal
6. The Layman's guide to Mutual Funds, Outlook Publishing(India) Pvt Ltd.
7. In the wonderland of Investment, A.N. Shanbhag & Sandeep Shanbhag, Vision Books India.

OPEN ELECTIVE

II B.COM IV SEMESTER

Banking Practices

No of Credits: 1

24 hours per semester (2 hours per week)

Learning objectives:

1. To highlight the practical Banking skills to the students.
2. To give an idea of recent trends in Banking.
3. To enhance the knowledge of Digital Banking Concepts.

Unit 1: Basics of Banking:

4 hrs

Banking – Meaning & Definitions

Procedure for Opening Bank Accounts (with reference to S.B a/c)

Procedure for applying loans – CIBIL

PMJDY – Features

Unit 2: Delivery Channels:

6 hrs

ATM – Phone Banking – Internet Banking – Mobile Banking- MICR- Electronic Clearings- Payment Gateways – Card Technologies.

Unit 3: Inter- Bank Payment Systems:

6 hrs

NEFT –RTGS- Negotiated Dealing systems and Securities Settlement Systems – Electronic Money – E cheques –IMPS.

Unit 4: Banking Operations:

8 hrs

Negotiable Instruments – Features – cheques- Demand Drafts – Endorsement – Crossing – Dishonour of Cheques.

Books for Reference:

1. Vasudeva : E- Banking, Common Wealth Publishers , New Delhi.
2. Bank Technology : Indian Institute of Bankers Publication.

IV SEMESTER B.Sc.

ELECTIVE PAPER

BSCPHOE 283: BASICS OF COMMUNICATION & ASTRONOMY
(2 hrs/week; Total 24 hrs)

Unit I

Electronic communication

Definition, Revolution in electronic communication- Telegraphy, telephony, radio, TV, optical fiber, satellite communication, audio signal, video signal (AF, RF, UHF, VHF) signals. Transducers- microphones, loudspeakers, Advantages of optical fiber communication, satellite communication, Antenna-Receiving antenna, transmitting antenna, Types of communication - short distance communication (AM, FM), Applications: Applications of optical fibre communication and satellite communication. (12 hrs)

Unit II

Basic Astronomy

Brief History of Astronomy: Geocentric Model of the Universe, Heliocentric model of Copernicus, Kepler's Laws, Newton's law of gravitation, Galileo and new astronomy. Spectra of light, Reflection and refraction of light, Basic principle of telescope, Types of telescopes – Optical, IR, Gamma ray, X- ray and Radio telescopes.

Solar system: Birth and evolution of solar system. Sun and its structure (mass, radius, size, density, temperature), photosphere, chromosphere, corona, sun spots and sun spot cycle.

Evolution of the earth, Structure of the earth (interior of the earth, mass, size and density, atmosphere, seasonal variation, magnetic field) Moon – structure of the moon (distance from the earth, mass, size, density, atmosphere, phases of the moon). Exploration of the moon. Eclipses – solar and lunar.

Stars : Birth, life and death of stars – life cycle of stars – Protostar to blackhole.

Universe: Origin and evolution of the universe. Expanding universe. Concept of Dark matter and dark energy. (12 hrs)

References Books:

1. Introduction to Astrophysics, Baidyanath Basu, Prentis Hall Publication (1997)
2. Astronomy – The Evolution of Universe, Michel Zeilik, John Wiley & Sons (1988)

Group II Open Elective
BSCCHOE283 : Food Chemistry and Chemistry in Daily Life

UNIT I

Food Chemistry

5hours

Food as source of energy and structural material. Components of food – Carbohydrates, Proteins, Oils and Fats. Micronutrients-Vitamins, minerals. Chemical substances used in food preparation - water, common salt, baking powder, vinegar. Food Processing. Food additives, preservatives and flavours. Explanation with examples for the preservation of food by the use of inhibitors, drying, salting, canning, pickling, smoking, packing and refrigeration. Food safety. Soft drinks-Components. Effects on health.

Food Adulteration

2Hours

Definition, common harmful effects, detection of adulteration, Prevention, Food adulteration act, artificial ripening of fruits - explanation with examples.

Chemistry of household materials

5Hours

Cleansing agents: Chemical composition of Soaps, detergents, dish washers, drain cleaners, bleaching powder, Tooth paste and shampoo. Stain removers - Explanation with some common examples.

Domestic items: Safety matches, Wax candles, shoe polish and mosquito coils, - their chemical composition.

Cosmetics: Talcum powder, nail polish, thinners, skin care, hair care, Lipsticks, sun protection lotions and creams, eye shadow and eyebrow pencils, antiperspirants, perfumes and deodorants-explanation with examples.

UNIT II

Chemistry for our future

12Hours

Alternative sources of energy: Need for the search of renewable sources of energy.

Solar Energy: Basic properties of solar energy. Applications of solar energy. Transformation of solar energy. Solar heat collectors. Solar photovoltaic collectors. Applications of solar collectors. Examples. Solar power plant.

Wind Energy: Basic properties of wind energy. Applications of wind energy. Transformation of wind energy. Wind turbines. Operative characteristics of wind turbines. Wind power plant. Utilization of wind power. Examples. Trends in wind energy utilization.

Hydro power: Basic properties water energy. Transformation of water energy. Hydro power plant. Utilisation of hydro power. Examples. Trends in hydro power utilization.

Hydrogen energy: Production and applications.

Ocean energy- Principles of ocean thermal energy, conversion system. Principles of wave and tidal energy conversion.

Transformation of biomass energy. Applications of biomass.

Reference Books:

10. Food: The Chemistry of its components -Tom Coultate, Kindle Edition.
11. Food Science and Technology-Geoffrey Campbelt-Platt,Wiley Blackwell, Kindle Edition.
12. Food chemistry by H.K.Chopra and P.S.Panesar (Narosa Publishing).
13. Chemistry at Home: Exploring the ingredients in everyday products- John Emsley, Royal Society of Chemistry (2015).
14. Chemistry in daily life - Kirpal Singh, Third Edition, Eastern Academy Education, PHI Learning Pvt. Ltd, New Delhi(2012).
15. Chemistry in everyday life-Shardendu Kislaya, Discovery Publishing House Pvt.Ltd(2011).
16. Renewable energy sources and emerging technologies-D.P.Kothari, K.C.Singal and Rakesh Ranjan, Eastern Economy Edition.

17. Solar energy: fundamentals and applications- H.P.Garg and J.Prakash, Mc Graw Hill, First Revised Edition.
18. Biomass regenerable energy-D.O.Hall and R.P.Overend, Wiley-Blackwel(1987).
19. Introduction to wind turbine aerodynamics – Alois Peter Schaffarczyk, Springler(2014).
20. Hydrogen and fuel cells: Fundamentals, technologies and applications-Detlef Stolten, Wiley-Vest(2010).

BSCMTOE283	Open Elective - D : Applications of Basic Arithmetics	1 Credit (24 Hours, 2 hours/week)
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(For other Streams)

Unit I. (12 Hours)

Number System, Decimal Fractions, Simplifications, Average, Problems on numbers, Problems on ages.

Unit II (12 Hours)

Concepts of Time and distance, Related problems, technique for problems related to Time and Work, Situations in Boats and Streams, velocity related problems, Simple problems on trains and other moving objects, different types of problems in Calendar, number of days, dates etc., Positions of hour hand and minute hand in Clocks, related problems.

References

- [1] R. S. Agarwal, *Quantitative Aptitude*, S. Chand & company Pvt. Ltd., 2014.
- [2] A. Balaraju, *Mental ability*, S M V Publishers, Kolar, 2015.
- [3] B. S. Sijwalii and Indu Sijwali, *Verbal and Analytical Reasoning*, Arihant Publishers, 2014.
- [4] H. S. Hall and F. H. Stevens, *An Elementary Course of Mathematics*, Macmillan and Co. Ltd., 1899.

open Elective in Computer Science (OE)

**GROUP-II
COURSE-7**

IV SEMESTER : Other Domain Subject

24 Hours

**Theory/Week : 2 hours
Credit:1**

**BSCCSOE 283- E1: Fundamentals of Information
Technology**

**IA: 10
Exam: 40**

Course Objectives:

- To make the students to learn and understand the basics of computer for its effective use in day to day life.

Course outcomes:

Upon successful completion of the course the student will:

- be able to know the functional units of computer, Input/output devices, storage devices.
- be able to know the computer software, network, Internet usage and cyber security issues.

UNIT - I

12 Hours

Introduction to Computers: Introduction, Characteristics computers, Evolution computers Generation of computers, Classification of computers, Application of computers. **Functional units Computer:** Block diagram of computer, functional components- CPU, main memory unit. **Primary memory:** Introduction, memory representation, memory hierarchy, Random access memory, Types of RAM, Read-only memory, Types of ROM. **Secondary Storage:** Introduction, classification, magnetic tape, magnetic disk, Optical disk, **Input devices:** Introduction, Types of input device- keyboard, mouse, scanner, web camera, Optical Mark Recognition, Bar code reader. **Output devices:** Introduction, Types of output devices- monitors, printers and plotters.

UNIT - II

12 Hours

Computer software: Introduction, software definition, relationship between software and hardware, software categories. **Computer Network and Internet:** Introduction to computer network, types of computer network- LAN, WAN, MAN. Basics of internet, www, http, html, IP Address, electronic mail, web browsers, search engines. **Social Media:** Twitter, Facebook, YouTube, WhatsApp, and LinkedIn, advantage and disadvantages, privacy issues. **E-commerce:** advantages of e-commerce, Benefits and limitations of ecommerce. Legal and ethical issues in ecommerce. **Cyber Security:** Cyber law, Cyber banking, E-payment, Security, Cyber act, Cybercrime. **Overview of Emerging Technologies:** Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

References

1. **Introduction to Information Technology**, IITL Education Solution Limited, Pearson Education, 2012.
2. Information Technology Amended Act, 2008

Elective Course IV BSCBOOE 283: Plant Diversity for Human Welfare

Unit I

Diversity and values of Plants: The Concept of Biodiversity, types of biodiversity-genetic, species and ecosystem diversity. Species diversity of plants – global, Indian and Karnataka. General values of plants and forests with examples- ethical value, consumptive use value, productive use value, ecosystem services value, aesthetic value and optional use value. Plants as sources of food and medicine: Plants as sources of protein, carbohydrate and dietary fibres. Agrobiodiversity and its importance. Brief history of domestication of rice. Plant based medicinal systems – Ayurveda, sidda, unani and folk medicine. Diversity of medicinal plants of India. Plants in beauty care. Contribution of medicinal plants to modern medicine – Important plant derived modern medicines and their uses. History of development of *Rauwolfia serpentina*, *Cinchona officinalis* and *Catharanthus roseus* based drugs.

Unit II

Plants in industry, culture and climate regulation: Industrially and commercially important plants and their products- paper, rubber, timber, cane, spices, beverages and sugar. Plants as sources of biofuel. Garden and ornamental plants. Religious and cultural use of plants. Role of plants and forests in climate and environment regulation- carbon sequestration and control of global warming, pollution control, regulation of water cycle and water purification. Conservation of plant diversity: Major threats to plant diversity and forests- habitat destruction, over exploitation and natural extinction. Rates of plant extinctions with examples. Concept of endangered and endemic plants. Methods of plant and forest conservation- botanical gardens, sacred groves, reserve forests, national parks and biosphere reserves.

ELECTED REFERENCE BOOKS: 1. Sharma O.P., 2015. Plants and Human Welfare. Pragathi Prakashan
2. S.K .Jain, 1995. Manual of Ethnobotany. Scientific publishers. 3. S. Sundar Rajan-2007. College Botany Vol-V, Part 1:Taxonomy and Economic Botany Himalaya Publishing House. 4. Susil Kumar Mukharjee-2004. College Botany Vol-III. New Central Book agency, London 5. P.Vasanth Kumar 2014. Economic Botany. Sonali Publications New Delh

GROUP II: ELECTIVE (ENABLING AN EXPOSURE TO SOME OTHER DISCIPLINE/DOMAIN):

IV SEMESTER: BSCZOOE 283: VERMITECHNOLOGY

(To be studied in the IV Semester B.Sc.)

(Hours of instruction: 2 hours per week. Total: 24 hours)

Syllabus

Unit - I: Biology and Ecology of Earthworms

1. Introduction, Systematic position, General characteristics of earthworm- habit, habitat, morphology (body organization, shape, size, clitellum, external openings). 4 Hrs
2. Ecological distribution of species (Epigeic, Endogeic, Anecic), Food habits (Detritivores, Geophages) and food preferences of earthworms, Reproduction (Life cycle, Regeneration). 4 Hrs
3. Importance of Earthworm in Agriculture, Waste management and as a Bio-indicator; Role of earthworms in soil structure – Carbon, Nitrogen and Phosphorous transformations. 4 Hrs

Unit - II: Vermiculture and Vermicomposting

1. Selection of suitable earthworm species, important features and examples (*Eudrilus euginiae*, *Eisenia fetida*, *Peryonix excavates*, *Lumbricus terrestris*). 4 Hrs
2. Physical factors - moisture, temperature, pH, aeration, light; Biological factors- Types of organic wastes (city garbage, city refuges, agricultural wastes, agro-industrial wastes, weeds, animal dung); Chemical factors affecting the earthworm culture. 4 Hrs

3. Vermicomposting methods- Small scale (Pot method, pipe method) and Large scale (pit method, heap method) vermicomposting units; Primary decomposition (Preparation of waste material), Secondary decomposition (introducing earthworms and daily maintenance), Harvesting of compost, Extraction of vermiwash. Uses of Vermicompost and vermiwash.

4 Hrs

REFERENCES:

1. A. Mary Violet Christy – Vermitechnology, MJP Publishers, 2008.
2. Arvind Kumar – Verms & Vermitechnology, APH Publishing, 2005.
3. Avnish Chauhan - Vermitechnology, Vermiculture, Vermicompost and Earthworms, Lap Lambert Academic Publishing, 2012.
4. M. Seethalekshmy, R. Santhi – Vermitechnology, Saras Publications, 2012.
5. Madhab Chandra Dash - Tools For Vermitechnology, I.K. International Publishing House, 2011.
6. S.M. Singh - Earthworm Ecology & Environment, International Book Distributing Co., 2009.
7. Shweta Yadav, Vinay Kumar Singh - Vermitechnology: Rebuilding of Sustainable Rural Livelihoods (Global Agriculture Developments), Nova Science Publishers Inc., 2014.
8. Yadav Shweta - Empowerment of Weaker Section of Society Through Vermitechnology, Lap Lambert Academic Publishing, 2014.

SCHEME OF EXAMINATION

Elective Papers (BSCZOCE 133 to BSCZOOE 283)

Question No.	PART - A	Marks
I	Answer any FIVE Questions out of SIX Questions (Give 3 questions from each unit)	5 x 2 = 10
	PART - B	
	Unit - I	
II	4 Marks Questions (Answer any TWO out of THREE)	4 x 2 = 8
III	7 Marks Questions (Answer any ONE out of TWO)	7 x 1 = 7
	Unit - II	
IV	4 Marks Questions (Answer any TWO out of THREE)	4 x 2 = 8
V	7 Marks Questions (Answer any ONE out of TWO)	7 x 1 = 7

IV SEMESTER

BSCMBOE 283: ELEMENTAL CONCEPTS OF MICROBIOLOGY

Total 24 hrs - 2 hrs/week

Unit I

12 hrs

1. Introduction to Microbiology: Definition and History of microbiology – Antony von Leuwenhoek, Louis Pasteur - Robert Koch. Microscope (Applications only.)
2. Importance of staining, Classification of microorganisms. Normal human microflora. (Bacteria- *S. aureus* , *E. coli* . Fungi- *Candida*.)
3. Sterilization and Disinfection: Common Methods of sterilization: Physical (Heat, radiation) and chemical methods (Soaps, Detergents and ethanol).

Unit II

12 hrs

1. Harmful role of microorganism in human life: Infections – Sources and transmission;
2. Diseases - Epidemic, Pandemic, Endemic. Common human diseases caused by Bacteria, Fungi, Protozoa and Viruses (examples to each and mentioning the respective causative agents),
3. Food spoilage and Food poisoning, Mushroom and Single cell protein, Role in Agriculture- N_2 fixation and decomposition of waste.

REFERENCES:

1. Prescott L M, J P Harley and D A Klein (2005). Microbiology. Sixth edition, International edition, McGraw Hill.
2. Pelczar TR M J Chan ECS and Kreig N R (2006). Microbiology. Fifth edition, Tata McGraw-Hill INC. New York.
3. Ananthanarayanan, R. and Jayaram Panicker C.K. (2004) *Text book of Microbiology*. Orient Longman, Hyderabad.
4. Jawetz, Melnick, & Adelberg's. (2013). Medical Microbiology. 26th Edition. McGraw-Hill.
5. Patel AH (2005). Industrial microbiology. Published by Mac Millan India Ltd., Chennai.
6. Subba Rao NS (2004). Soil Microbiology. Fourth edition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

IV SEMESTER B.Sc.

ELECTIVE PAPER

BSCPHOE 283: BASICS OF COMMUNICATION & ASTRONOMY
(2 hrs/week; Total 24 hrs)

Unit I

Electronic communication

Definition, Revolution in electronic communication- Telegraphy, telephony, radio, TV, optical fiber, satellite communication, audio signal, video signal (AF, RF, UHF, VHF) signals. Transducers- microphones, loudspeakers, Advantages of optical fiber communication, satellite communication, Antenna-Receiving antenna, transmitting antenna, Types of communication - short distance communication (AM, FM), Applications: Applications of optical fibre communication and satellite communication. (12 hrs)

Unit II

Basic Astronomy

Brief History of Astronomy: Geocentric Model of the Universe, Heliocentric model of Copernicus, Kepler's Laws, Newton's law of gravitation, Galileo and new astronomy. Spectra of light, Reflection and refraction of light, Basic principle of telescope, Types of telescopes - Optical, IR, Gamma ray, X-ray and Radio telescopes.

Solar system: Birth and evolution of solar system. Sun and its structure (mass, radius, size, density, temperature), photosphere, chromosphere, corona, sun spots and sun spot cycle.

Evolution of the earth, Structure of the earth (interior of the earth, mass, size and density, atmosphere, seasonal variation, magnetic field) **Moon** - structure of the moon (distance from the earth, mass, size, density, atmosphere, phases of the moon). Exploration of the moon. Eclipses - solar and lunar.

Stars : Birth, life and death of stars - life cycle of stars - Protostar to blackhole.

Universe: Origin and evolution of the universe. Expanding universe. Concept of Dark matter and dark energy. (12 hrs)

References Books:

1. Introduction to Astrophysics, Baidyanath Basu, Prentis Hall Publication (1997)
2. Astronomy - The Evolution of Universe, Michel Zeilik, John Wiley & Sons (1988)